

UDC 2300

UDC 3000

UDC 3300

UDC 5000

UDC 6000

UDC 6300

Universal Digital Controllers

**RS422/485 ASCII Communications
Option**

Product Manual

**51-51-25-35H
9/99**

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About This Publication

The UDC manual for RS422/485 ASCII communications option contains the following sections:

- Section 1 – Overview
- Section 2 – Installation
- Section 3 – Establishing Communications
- Section 4 – Read and Write Operations
- Section 5 – Reading, Writing, and Overriding Parameters on UDC 3000
Versa-Pro Controllers
- Section 6 – Reading, Writing and Overriding Parameters on UDC 5000
Ultra-Pro Controllers
- Section 7 – Reading, Writing, and Overriding Parameters on UDC 6000
Process Controllers
- Section 8 – Reading, Writing, and Overriding Parameters on UDC 6300
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- Section 9 – Reading, Writing, and Overriding Parameters on UDC 3300
Process Controllers
- Section 10 – Reading, Writing, and Overriding Parameters on UDC 2300
Process Controllers
- Section 11 – Operating the Controller with Communications Option
- Section 12 – ASCII Conversion Table
- Section 13 – Cable Specifications

Communication between your computer and the UDC Controller is accomplished for one piece of information (parameter) at a time. Each parameter has an associated identifying code.

The Identifying Code and Format Code will be listed along with information pertaining to that parameter.

The identifying codes are grouped in the same order as they appear in the controller configuration prompts.

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Parameters

ADDRESS 2 Communication Address (Loop 2)
ADDRESS Communication Address (Loop 1)
BAUD RATE Baud Rate (bits/second)
COM STATE.....Communication State
CSP BIAS Commun. SP Bias (Loop 1)
CSP RATIOCommun. SP Ratio (Loop 1)
CSP2 BIAS Commun. SP Bias (Loop 2)
CSP2 RATIOCommun. SP Ratio (Loop 2)
DUPLEX Duplex Operation
PARITYParity
SHED MODEController Shed Mode and Output Level
SHED SP Shed Setpoint Recall
SHED TIMEShed Time
TX DELAY Transmission Delay
UNITS.....Communication Units

References

| Publication Title | Publication Number |
|---|-------------------------------|
| <i>UDC 3000 Controller Product Manual</i> | 51-52-25-07 |
| <i>UDC 3000 Limit Controller Product Manual</i> | 51-52-25-09 |
| <i>UDC 5000 Controller Product Manual</i> | 51-51-25-17 |
| <i>UDC 6000 Controller Product Manual</i> | 51-52-25-32 |
| <i>UDC 6300 Controller Product Manual</i> | 51-52-25-45 |
| <i>UDC 6300 Indicator Product Manual</i> | 51-52-25-46 |
| <i>UDC 3300 Controller Product Manual</i> | 51-52-25-55 |
| <i>UDC 3300 Limit Controller Product Manual</i> | 51-52-25-56 |
| <i>UDC 2300 Controller Product Manual</i> | 51-52-25-73 |

Section 1 – Overview

1.1 Introduction

- The communications option** The RS422/485 Communications Option on the UDC Controller provides a serial multi-drop link whereby up to fifteen UDC controllers connect directly to a host computer.
- Monitor or slave mode** The UDC controller can be placed in monitor or slave by the host computer. When monitored, the controller will send Configuration, Tuning, and Operating parameters to the host computer. When in slave, the controller will be switched through the communications interface board to "Slave" operation. This means that the computer can write configuration or tuning information into any controller on the link including overriding of PV, the setpoint, and output.
- Message exchanges** The computer and the controllers talk to each other through a series of message exchanges. There are two RS422/485 message exchange protocols: Configuration or Loopback.

1.2 Message Exchange Protocols

Configuration protocol

Table 1-1 lists the rules and regulations of configuration protocol.

Table 1-1 Rules and Regulations for Configuration Protocol

| Protocol | Rule |
|-------------------------------|--|
| Data Type Transactions | The configuration protocol permits reading or writing of data type transactions such as PV, SP, or Output, as well as configuration type transactions such as Tuning, Algorithm selections, etc. |
| Read | Read transactions can be performed in either UDC state: Monitor or Slave. |
| Write | Write transactions can only be performed in the Slave mode. |
| Busy | Following any Write message, a Busy indication is returned. |
| Ready | A Ready transaction is required as the next message request to determine if the information received was correct. |
| Transaction Limits | In a Write transaction, only single items are permitted to be written, however, for Read transactions, single or multi-item parameters may be requested. |

Loopback

Loopback protocol is also provided for link tests. With this message exchange you can test the Communications link between your computer and the controllers on the link. The host computer sends a series of ASCII characters to the desired device, and the device returns the characters it received to the host computer.

Checksum

There is an optional transaction called "Checksum" which is used to increase security on the RS422/485 link. Used with any message exchange, it enables both your computer and controller to detect messages that have been interrupted by line noise.

Controller Address

Each controller will have its own specific address. If you have a 2 loop controller, there will be a specific address for each loop.

Keyboard Configuration

Address, Baud Rate, and Parity are keyboard selectable as well as Shed Time, Shed Mode, and Output Level.

1.3 Field Upgrade

Adding the communications option

RS422/485 Communications Option can be added in the field by installing the proper RS422/485 Printed Wiring Board Assembly.

Table 1-2 lists the part numbers required to add the RS422/485 Communication option Printed Wiring Board to the UDC controllers.

Table 1-2 Upgrade PWB Part Numbers

| Model | Upgrade PWB Part Numbers |
|----------|--|
| UDC 2300 | Part Number 51309831-501 |
| UDC 3000 | Part Number 30756693-501 |
| UDC 3300 | Part Number 30756693-501 or Part Number 30756687-502 (Aux Out/RS-485) |
| UDC 5000 | Part Number 30755865-502 |
| UDC 6000 | Part Number 30755865-501 |
| UDC 6300 | Part Number 30755865-504 |

ATTENTION

Early version UDC 5000 with 28-pin PROM cannot be upgraded to RS422/485 unless the PROM socket has 32-pin receptacles.

Section 2 – Installation

2.1 Introduction

General

The Installation section (Section 2) of the UDC Product Manual contains information and drawings required to mount and wire the controller. Refer to the Controller Product Manual for appropriate information regarding the basic installation requirements.

Electrical noise protection

When installing and wiring the controller, follow the practices that conform to all local codes and ordinances. In addition, be aware of the precautions you should take to avoid electrical noise.

Electrical noise is unwanted electrical signals that provide undesirable effects. Digital equipment is especially sensitive to the effects of electrical noise. The controller has built-in circuits to reduce the effects of this noise.

For information concerning further reduction of electrical noise, refer to "How to Apply Digital Instrumentation in Severe Electrical Noise Environments" – in the UDC Controller Product Manual or Honeywell Document 51-52-05-01.

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2.2 RS232 to RS485 Converters

Overview

Up to 16 devices on an RS485 link can be connected to your computer by installing a Black Box or Westermo RS232 to RS485 converter between the RS232 port on your computer and the devices on the RS485 link.

These devices include:

- UDC2300, UDC3000, UDC 5000, UDC3300, UDC6000, or UDC6300 Controllers with an RS485 Communications Option

Converters

Table 2-1 lists the specific information needed to procure either of these converters.

Table 2-1 Converters

| Arrangement | Description |
|--|--|
| Black Box Converter | <p>Using the RS232 port and a Black Box RS232 to RS485 converter installed between the RS232 port and the first device on the link.</p> <p>This converter is available from . . .</p> <p>Black Box Corp Pittsburgh PA..</p> <p><i>Model</i></p> <p>IC109A - Stand alone RS232 to RS485/422 converter with opto-isolation</p> |
| Westermo Converter (Europe) | <p>Using the RS232 port and a Westermo RS232 to RS485 converter installed between the RS232 port and the first device on the link.</p> <p>The Westermo converter can be ordered from a Honeywell sales office, Part Number 46210088-001.</p> <p>A 2 meter shielded cable with Female/Male DB9/DB25 connectors for use between the PC communication port and the Westermo box is also available, Part Number 46210061-002</p> |

2.3 Using a Black Box Converter

Wiring the Black Box converter and the link

Figure 2-1 shows the wiring diagram and terminal connections for wiring the RS232 to RS485 Black Box converter.

Follow the procedure in Table 2-2 to wire the Black Box converter.

Table 2-3 shows the terminal designation for the devices on the link.

Table 2-2 Black Box Converter Wiring Connections Procedure

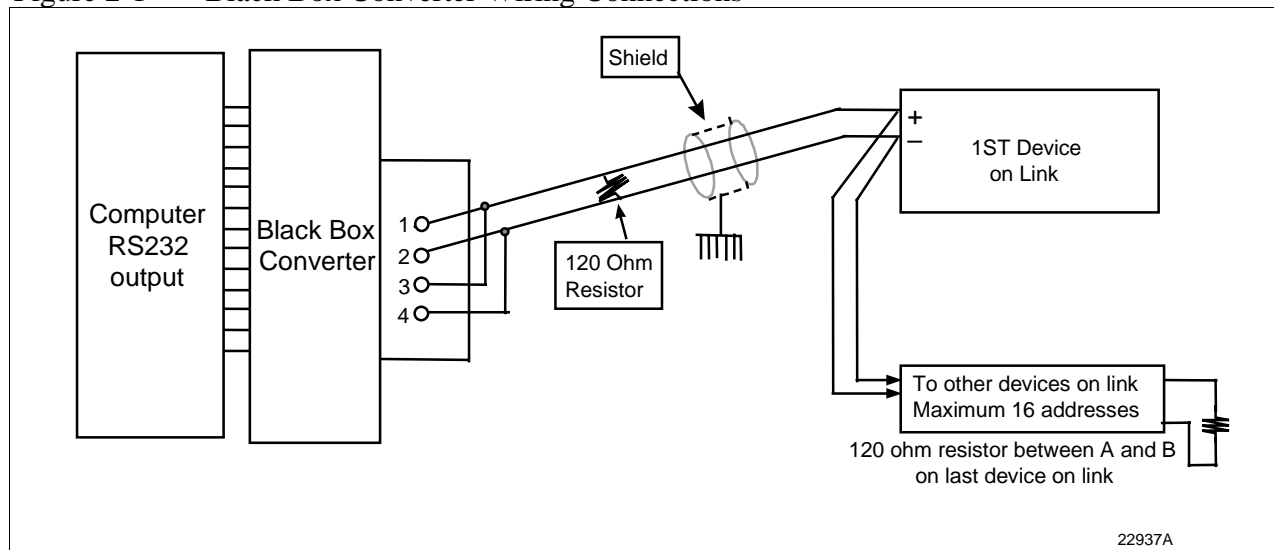
| Step | Action | | | | | | | | | | | | | | | | | | | | | | |
|---------------|---|---------------|----------------|------|-----|----|--------------|-----|--------------------|----|------------------------------|----|------------|-----|------------|-----|--------------|----|--------------|----|--------------------------------|----|-------------------|
| 1 | Install an appropriate Serial Communication Connector between the Computer serial port and the RS232 input connector of the Black Box converter. <i>See the Black Box data sheet for the required interfacing signals.</i> | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Connect one wire to terminal 2 (-). | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Connect other wire to terminal 1 (+). | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Connect a 120 ohm resistor across 1 and 2. | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Set the jumpers on the Black Box converter Printed Circuit Board as follows: <table><tr><td>JUMPER</td><td>SETTING</td></tr><tr><td>XW1A</td><td>DCE</td></tr><tr><td>W8</td><td>B-C (2-wire)</td></tr><tr><td>W15</td><td>B-C (Data Enabled)</td></tr><tr><td>W5</td><td>A-B (RTS/CTS delay - normal)</td></tr><tr><td>W9</td><td>C (0 msec)</td></tr><tr><td>W17</td><td>C (2 msec)</td></tr><tr><td>W16</td><td>B (0.1 msec)</td></tr><tr><td>S1</td><td>OUT (Normal)</td></tr><tr><td>S2</td><td>ON (RS485 Receiver Terminated)</td></tr><tr><td>S3</td><td>ON (Line Bias On)</td></tr></table> | JUMPER | SETTING | XW1A | DCE | W8 | B-C (2-wire) | W15 | B-C (Data Enabled) | W5 | A-B (RTS/CTS delay - normal) | W9 | C (0 msec) | W17 | C (2 msec) | W16 | B (0.1 msec) | S1 | OUT (Normal) | S2 | ON (RS485 Receiver Terminated) | S3 | ON (Line Bias On) |
| JUMPER | SETTING | | | | | | | | | | | | | | | | | | | | | | |
| XW1A | DCE | | | | | | | | | | | | | | | | | | | | | | |
| W8 | B-C (2-wire) | | | | | | | | | | | | | | | | | | | | | | |
| W15 | B-C (Data Enabled) | | | | | | | | | | | | | | | | | | | | | | |
| W5 | A-B (RTS/CTS delay - normal) | | | | | | | | | | | | | | | | | | | | | | |
| W9 | C (0 msec) | | | | | | | | | | | | | | | | | | | | | | |
| W17 | C (2 msec) | | | | | | | | | | | | | | | | | | | | | | |
| W16 | B (0.1 msec) | | | | | | | | | | | | | | | | | | | | | | |
| S1 | OUT (Normal) | | | | | | | | | | | | | | | | | | | | | | |
| S2 | ON (RS485 Receiver Terminated) | | | | | | | | | | | | | | | | | | | | | | |
| S3 | ON (Line Bias On) | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Create a chain of up to 16 devices by connecting them with shielded twisted pair wiring (Belden 9271 Twinax or equivalent) to a maximum total length of 4000 feet(1250 meters). (See Section 12—Cable Specifications.) REFER TO TABLE 2-3 FOR TERMINAL DESIGNATIONS OF THE DEVICES ON THE LINK | | | | | | | | | | | | | | | | | | | | | | |

2.3 Using a Black Box Converter, Continued

Black Box wiring connections

Figure 2-1 shows the wiring for the Black Box converter and the devices on the link.

Figure 2-1 Black Box Converter Wiring Connections



Link devices terminal connections

Table 2-3 lists the terminal connections between the Black Box converter and the devices on the communication link.

Table 2-3 Terminal Connections for Black Box Converters

| BLACK BOX | UDC3000 UDC3300 | UDC6000 UDC6300 | UDC5000 | UDC2300 |
|-----------|--------------------|--------------------|---------|---------|
| 2 | 15 | 23 | 11 | 14 |
| 1 | 14 | 22 | 12 | 13 |

2.4 Using a Westermo Converter

Wiring the Westermo converter and the link

Figure 2-2 shows the recommended switch setting for the WESTERMO converter.

Figure 2-3 shows the wiring diagram and terminal connections for wiring the RS485 Westermo converter.

Follow the procedure in Table 2-4 to configure and wire the Westermo converter.

Table 2-5 shows the terminal designation for the devices on the link.

Table 2-4 Westermo Converter Configuration and Wiring Procedure

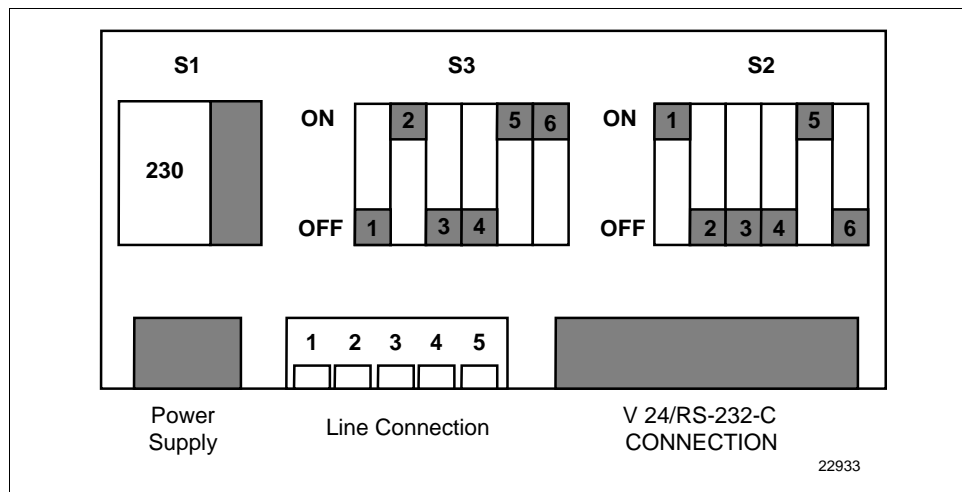
| Step | Action |
|------|---|
| 1 | Install an appropriate Serial Communication Connector between the Computer serial port and the RS232 input connector of the Westermo converter. See the Westermo data sheet for the required interfacing signals. |
| 2 | Configure the switch settings on the Westermo converter as shown in Figure 2-6. |
| 3 | Connect the shield to terminal 5. See Figure 2-3. |
| 4 | Connect one wire to terminal 3 (-). |
| 5 | Connect other wire to terminal 4 (+). |
| 6 | Connect a 120 ohm resistor across terminals 3 and 4. |
| 7 | Create a chain of up to 16 Devices by connecting them with shielded twisted pair wiring (Belden 9271 Twinax or equivalent) to a maximum total length of 4000 feet(1250 meters). (See Section 13—Cable Specifications.) REFER TO TABLE 2-5 FOR TERMINAL DESIGNATIONS OF THE DEVICES ON THE LINK |

2.4 Using a Westermo Converter, Continued

Configuring the WESTERMO Converter

Figure 2-2 shows the recommended switch settings for the WESTERMO converter.

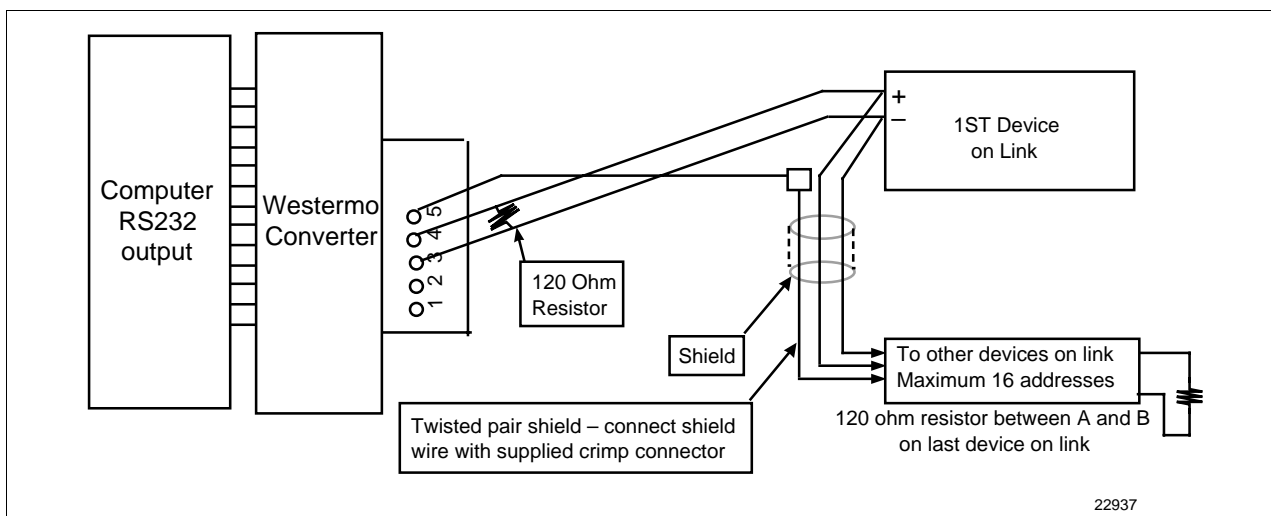
Figure 2-2 Recommended Switch Settings for Westermo Converter



Westermo wiring connections

Figure 2-3 shows the wiring for the Westermo converter and the devices on the link.

Figure 2-3 Westermo Converter Wiring Connections



Link devices terminal connections

Table 2-5 shows the terminal connections between the Westermo converter and the devices on the communication link.

Table 2-5 Terminal Connections for Westermo Converters;

| Westermo Line Connections | UDC 3000 UDC 3300 | UDC 5000 | UDC 6000 UDC 6300 | UDC 2300 |
|---------------------------|----------------------|----------|----------------------|----------|
| 3 | 15 | 11 | 23 | 14 |
| 4 | 14 | 12 | 22 | 13 |

2.5 Wiring Diagrams

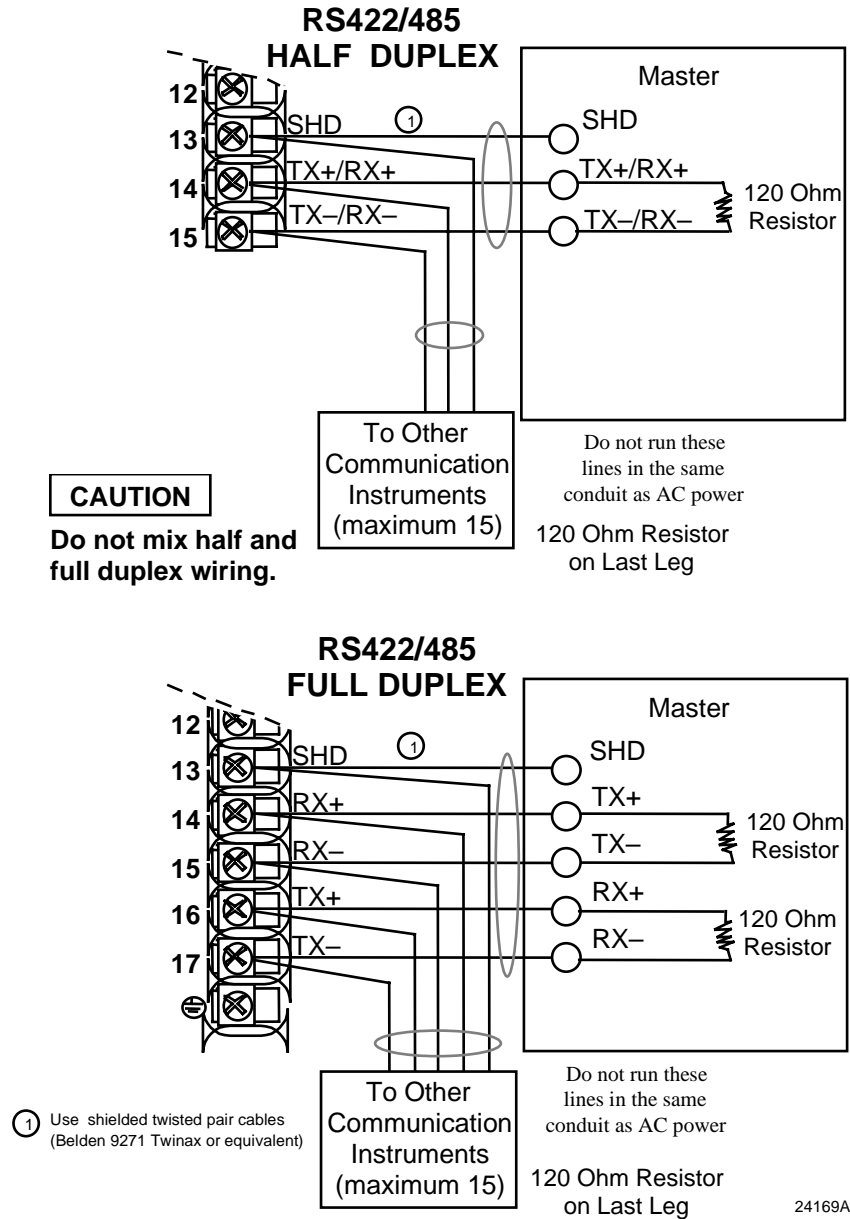
Communications option Figure 2-4: UDC3000 and UDC3300 connections

Figure 2-5: UDC6000 and UDC6300

Figure 2-6: UDC5000

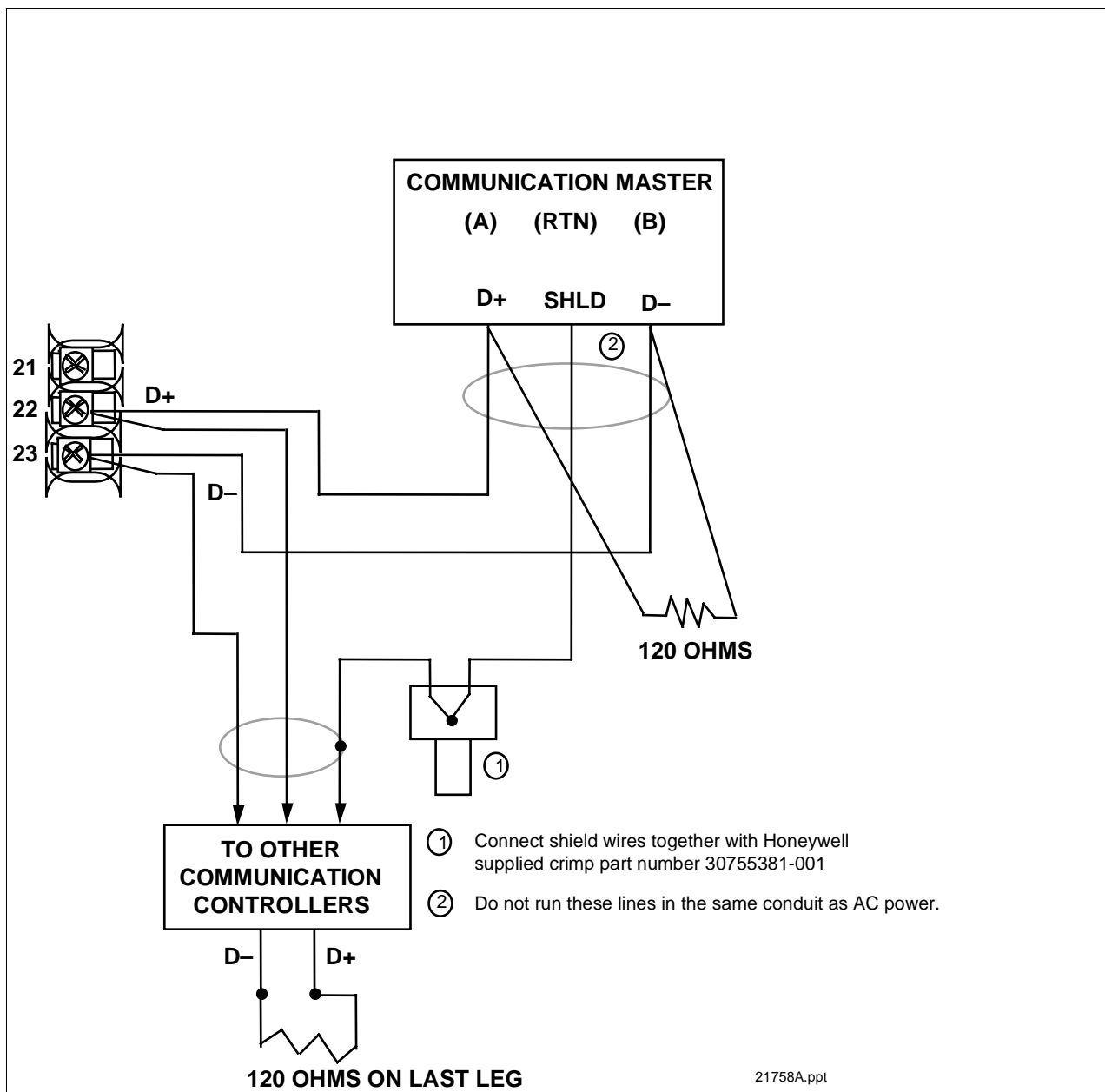
Figure 2-7: UDC 2300

Figure 2-4 UDC3000/3300 Connections



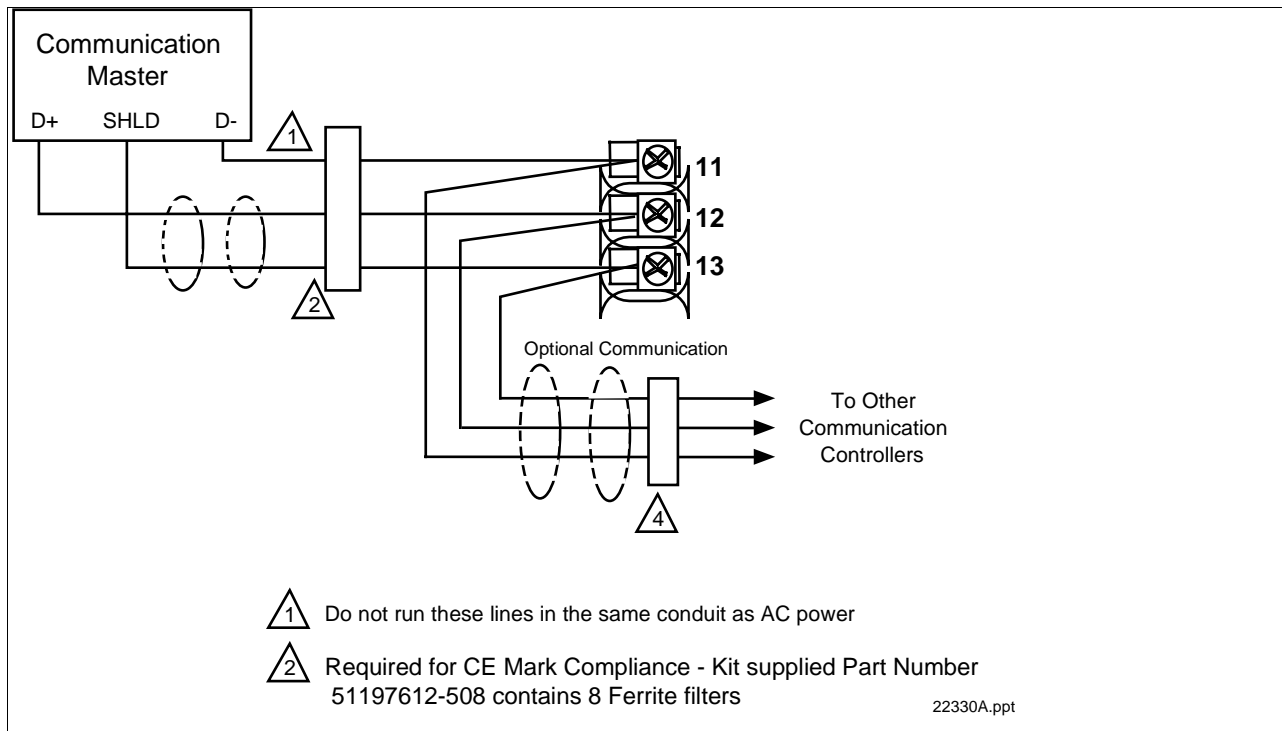
2.5 Wiring Diagrams, Continued

Figure 2-5 UDC6000/6300 Connections



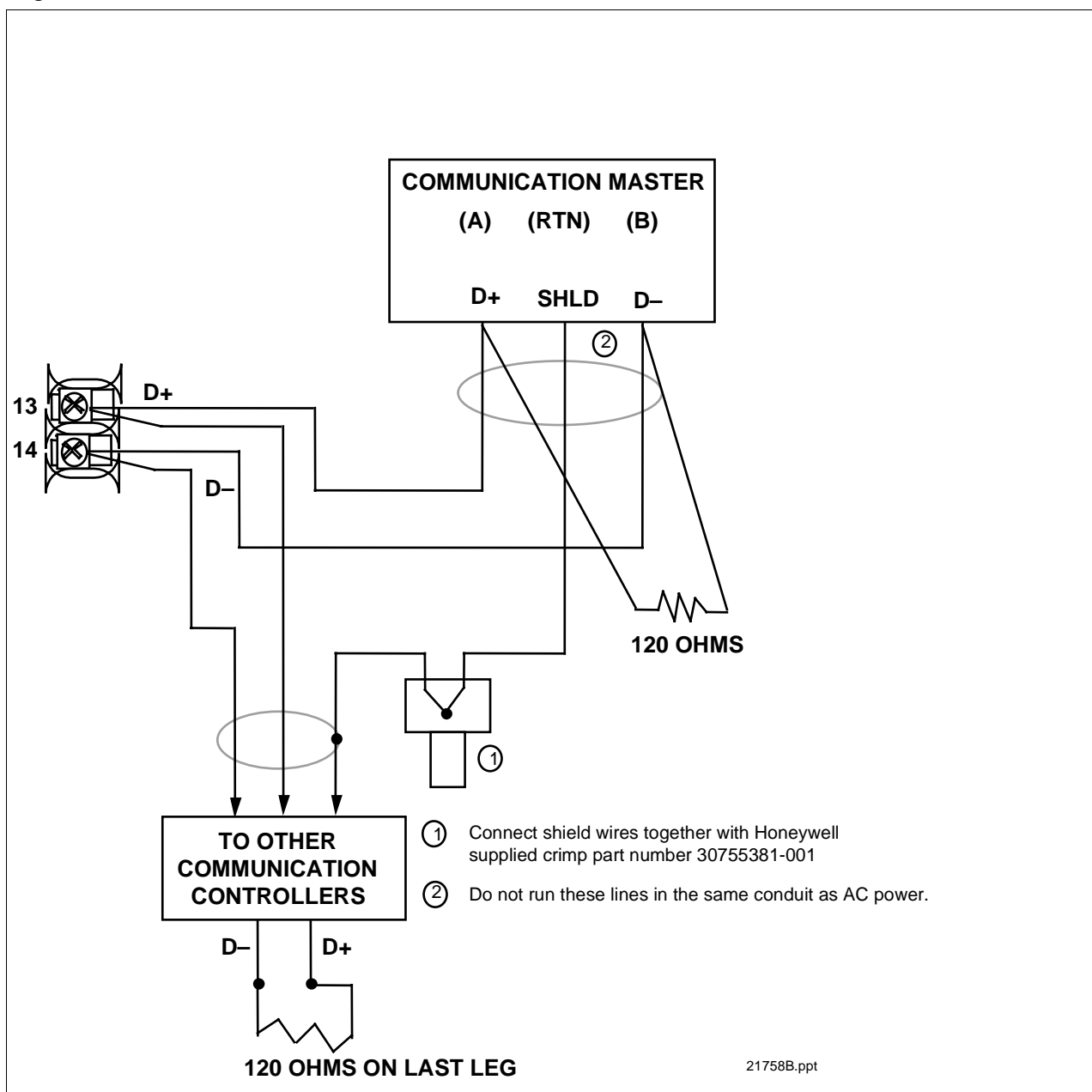
2.5 Wiring Diagrams, Continued

Figure 2-6 UDC5000 Connections (without Digital Input Option)



2.5 Wiring Diagrams, Continued

Figure 2-7 UDC2300 Connections



Section 3 – Establishing Communications and Testing

3.1 Preparing the Controller for Communications

Introduction

Each controller on the RS422/485 Communications link must be configured at the controller level for certain parameters before communications between the Host and the Controller can be accomplished.

Synchronization

Before you attempt to exchange messages between your computer and the controllers on the RS422/485 link, you must set up the controller for the same form of data transmission that the host computer's RS422/485 interface uses. This is called Synchronization.

You must match the controller Baud Rate and Parity with that of your computer.

Configurable parameters

Table 3-1 is a list of parameters that should be configured, their definitions, range of settings or selections, the procedure for entering the information into the controller is found in Table 3-2.

Table 3-1 Communications Parameters

| Parameter | Definition |
|-------------------------------|--|
| Communications State | Enables or disables the Communication function in the controller. |
| Communications Address | <p>This is a number that is assigned to a controller (limited to 15 controllers) that will be used during communications. This number will be its address on the link (address 0-99).</p> <p>If your controller has two loops, each loop must have its own individual address (i.e. Loop 1, #6; Loop 2, #7).</p> |
| Shed | Term used to describe a point in time when the controller, which had been working as a slave, reverts to an independent, stand alone controller using its own inputs, configuration data and control mode. Shed will happen when a controller is in slave, the shed is not zero, and the communication stops. |
| Shed Time | The number selected will represent how many sample periods will elapse before the controller sheds from computer control. Each period equals 1/3 second. 0 = No shed. |
| Duplex | Selection made for transmission type. Two-wire transmission is half duplex. Four-wire transmission is full duplex. |
| TX Delay | Configurable response delay timer allows you to force the UDC to delay its response for a time period of from 1 to 500 milliseconds. Compatible with the host system hardware/software. |

3.1 Preparing the Controller for Communications, Continued

Parameters,
continued

Table 3-1 Communications Parameters, Continued

| Parameter | Definition |
|--|--|
| Shed Controller Mode and Output Level | <p>This selection determines the mode of local control whenever the controller is SHED from the slave mode.</p> <ul style="list-style-type: none"> • <u>Last Mode and Output</u> – The controller will return to the same mode (Manual or Automatic) and Output level that it was in before shed. • <u>Manual Mode, Last Output</u> – The controller will return to manual mode and the last output level it was in before shed. • <u>Manual Mode, Failsafe Output</u> – The controller will return to manual mode at the output level selected at ID code 40 – Failsafe Output Value. • <u>Shed to Automatic Mode</u> – The controller will return to automatic mode. |
| Shed Setpoint Recall | <p>This selection determines what setpoint will be used if the controller is shed from the communications link.</p> <ul style="list-style-type: none"> • <u>TO LSP</u> – The controller will use the last local setpoint stored. • <u>TO CSP</u> – The controller will store the last computer setpoint and use it at the Local Setpoint (LSP1, LSP2, or LSP3, whichever is in use). |
| Parity | <p>Transmitting each ASCII character requires 8 bits:</p> <ul style="list-style-type: none"> • 7 bits for the character code • 1 bit (the eighth) for Parity, which may represent either ODD or EVEN parity. <p>Thus, the controller can accommodate your computer's choice of parity (odd or even) and perform parity checks on your computer's data transmission. The controller will return STATUS CODE 04 if it detects incorrect parity.</p> |
| Baud Rate | <p>This is the transmission speed in bits per second. In order to communicate properly, the controller must be set to the same Baud Rate as your computer. The Baud Rate selections are: 300, 600, 1200, 2400, 4800, 9600, or 19,200.</p> |
| Communication Units | <p>This selection determines how the controller values are expressed during communications:</p> <p>Percent of span or Engineering units.</p> |
| Communications Setpoint Ratio | <p>Ratio value for computer setpoint. The range is from -20.00 to +20.00.</p> |
| Communications Setpoint Bias | <p>Bias value for computer setpoint. The range is from -999 to 9999.</p> |

3.1 Preparing the Controller for Communications, Continued

Procedure The procedure in Table 3-2 tells you what keys to press on the controller keyboard, the upper and lower display indications, and the range of settings available to you.

Not all prompts may be available for your particular controller.

Use ▲▼ to make adjustments to the range of setting or selection.


Table 3-2 Controller Procedure for Communication Parameters

| Step | Press | Lower Display | Upper Display Range of Setting or Selection | Parameter Description |
|------|-----------------------|--|--|---------------------------------------|
| 1 | <div>SET UP</div> | COMMUN | | |
| 2 | <div>FUNC</div> | successive presses of the [FUNCTION] key will sequentially display all the functions and their values or selections. | | |
| | | COM STATE | DISABLE DMCS RS422 | Communication State |
| | | ADDRESS | 01 to 99* * Address 00 disconnects it from the link | Communication Address (Loop 1) |
| | | ADDRESS 2 | 01 to 99* (must be different from Loop 1) * Address 00 disconnects it from the link | Communication Address (Loop 2) |
| | | SHED TIME | 0 to 255 Sample periods 0 = No Shed will occur | Shed Time |
| | | PARITY | ODD EVEN | Parity |
| | | BAUD RATE | 300 4800 600 9600 1200 19200 2400 | Baud Rate (bits/second) |
| | | SHED MODE | LAST FAILSAFE TO MAN TO AUTO | Controller Shed Mode and Output Level |
| | | SHED SP | TO LSP TO CSP | Shed Setpoint Recall |
| | | DUPLEX | HALF FULL | Duplex Transmission Type |
| | | TX DELAY | 1 to 500 milliseconds | Transmission Delay Timer |

3.1 Preparing the Controller for Communications, Continued

Procedure, continued

Table 3-2 Controller Procedure for Communication Parameters, Continued

| Step | Press | Lower Display | Upper Display Range of Setting or Selection | Parameter Description |
|------|---|--------------------------------|---|------------------------------|
| | | UNITS | PERCENT ENG UNITS | Communication Units |
| | | CSP RATIO | –20.00 to +20.00 | Commun. SP Ratio (Loop 1) |
| | | CSP BIAS | –999 to +9999 | Commun. SP Bias (Loop 1) |
| | | CSP2 RATIO | –20.00 to +20.00 | Commun. SP Ratio (Loop 2) |
| | | CSP2 BIAS | –20.00 to +20.00 | Commun. SP Bias (Loop 2) |
| 3 |  | TO RETURN TO NORMAL CONTROL | | |

3.2 Programming Your Computer

- Introduction** To program your computer for communication with the various controllers on the link, you write input and output statements to send and receive ASCII character strings to and from the controller. (See ASCII and Hexadecimal conversion table in Section 12.) You treat the controller like any I/O device.
- Request** To send a request, you program your computer to output the appropriate character string to the controller.
- Response** To get a response, you program your computer to input the expected character string from the controller.
- Example** The following programming statements show how you would output a request message and read the resulting response. This example is written in Fortran and uses the following assignments:
- I/O Channel 5 for your computer's RS422/485 Transmit Data Line.
 - I/O Channel 6 for your computer's RS422/485 Receive Data Line.
 - I/O Channel 7 for your computer's printer or terminal.

Table 3-3 lists the programming statements for this example.

Table 3-3 Programming Statements

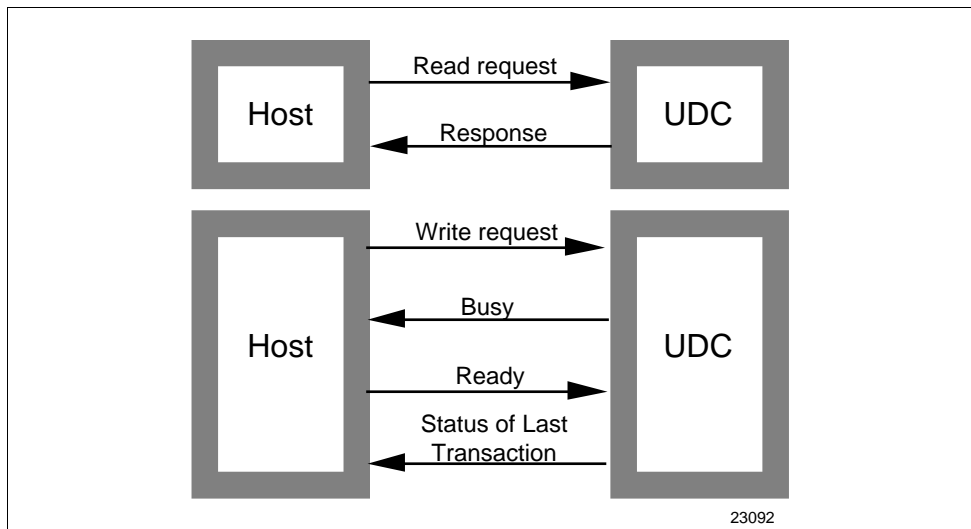
| Step | Statement | Action |
|--------------------------------|--|--|
| Sending the Request | 10 Write (5,20) 20 Format ("XXXXXXX") | Writing the character string the character string XXXXXXXX to I/O channel 5 which transmits the character string XXXXXXXX to the controller. |
| Getting the Response | 30 Read (6,40) Reply 40 Format (12) | Reading the character string at I/O Channel 6 which receives data from the controller into reply. |
| Displaying the Response | 50 Write (7,60) Reply 60 Format (12) | Writing the contents of Reply to I/O Channel 7, a printer or terminal. |

3.3 Message Exchange

What is a message exchange?

Your computer communicates with the UDC controllers using the RS422/485 link. Each communication takes place as a message exchange: Your computer sends a request message (ASCII characters), and then waits for the resulting response from the controller involved (ASCII characters). Figure 3-1 shows how this occurs.

Figure 3-1 Message Exchanges



Sending requests

Your computer is the host, it initiates a message exchange. The UDC controllers are respond-only devices.

When you send a Read request, the UDC responds with the data requested. If you write configuration or override data into a UDC, the UDC responds with a Busy message (0082xx). The host should send a Ready message at which time the UDC will respond with a status of the write transaction. Communication with a single UDC should not be faster than 1/3 second.

Until the UDC completes processing of the data, any subsequent valid message received is answered with a busy response.

3.4 Request Messages

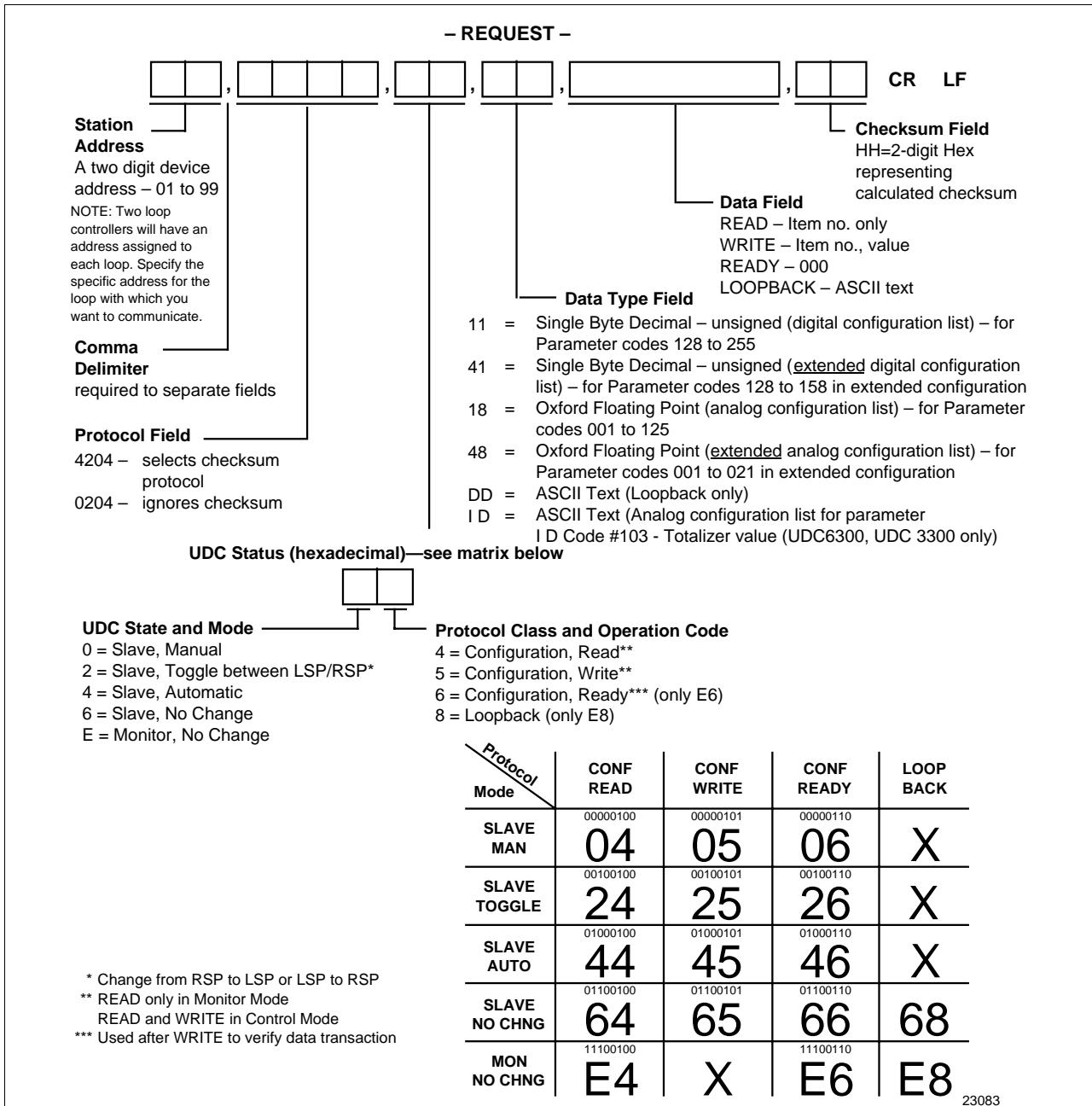
What is a request message?

Your computer queries a controller and indicates the communication function, or operation, that the controller should perform by sending a request message. Request messages are composed of standard fields, separated by commas. Each field contains a certain kind of information, which you must enter in order to have a valid request message.

Request message fields

Figure 3-2 shows the request message fields and the selections that may be entered into each field. Table 3-4 lists these selections and their definitions.

Figure 3-2 Request Message Fields



3.4 Request Messages, Continued

Request message field selections

Table 3-4 is a list of selections for the request message fields and their definitions.

Table 3-4 Request Message Fields Definitions

| Selection | Definition |
|--|---|
| Station Address | <p>A two digit device address – from 01 to 99 – that identifies the specific controller you are addressing. You must assign a unique station address to each controller on the link.</p> <p>For a 2 Loop controller, two distinct addresses must be configured. One address is used to designate Loop 1; and one is used to designate Loop 2. Either address may be used for transactions which are loop independent.</p> <p>See "Preparing the Controller for Communications" in this manual. A UDC will not respond to address 0 since the address results in a disconnect.</p> |
| Protocol Field | <p>A four digit number that selects whether or not you are going to use a Checksum Protocol (for increased data security) with your message exchange.</p> <ul style="list-style-type: none">• 4204 selects Checksum Protocol – see "Checksum Protocol"• 0204 ignores Checksum Protocol <p>Any sequence utilizing other than 4 or 0 in the first digit results in an error with an error message returned.</p> |
| UDC State and Mode | <p>A hexadecimal number that determines what state you want the UDC to be in (monitor or slave) and the mode of operation desired (manual or automatic). You can also change the controller setpoint from Local setpoint to Remote setpoint or vice-versa.</p> <p>ATTENTION Any change made in UDC State or Control mode will not be indicated in the response until the next transaction.</p> |
| Protocol Class and Operation Code | <p>A hexadecimal number that allows you to do a Loopback or do a READ, WRITE, or READY transaction.</p> |

3.4 Request Messages, Continued

Request message
field selections,
continued

Table 3-4 Request Message Fields Definitions, Continued

| Selection | Definition |
|----------------------------------|--|
| Data Type Field | <p>A two digit number that specifies the format, or data type, of each of the parameters that can be accessed in the UDC controller.</p> <p>11 = Single Byte Decimal (unsigned) – used with configuration protocol for <u>digital</u> parameter code numbers 128 through 255.</p> <p>41 = Single Byte Decimal (unsigned) – used with configuration protocol of <u>extended digital</u> parameter code numbers.</p> <p>18 = Floating Point Format – used with configuration protocol for <u>analog</u> parameters code numbers 001 through 125.</p> <p>48 = Floating Point Format – used with configuration protocol for <u>extended analog</u> parameter code numbers.</p> <p>DD = ASCII Text – Used with loopback protocol only.</p> <p>ID = ASCII Text – Used with configuration protocol for Analog Parameters ID Code #103 (UDC 6300, UDC 3300 only)</p> |
| Data Field | <p>The data in this field is determined by the type of request:</p> <ul style="list-style-type: none"> • READ – three digit parameter code which identifies a particular parameter for which you want to know the value or selection. • WRITE – three digit parameter code, which identifies a particular parameter you want to change, a comma (,), and the value or selection you want to enter. • READY – three zero's (000) – used in conjunction with a write request. Sent after a write request to verify that the information transmitted was received. • LOOPBACK – ASCII Text |
| Checksum Field (Optional) | <p>This field is a one byte hexadecimal value (two ASCII characters) representing the binary sum, ignoring carries, generated by adding the ASCII code for each character in the message exchange, up to but not including the checksum and the CR and LF characters.</p> <ul style="list-style-type: none"> • No Characters = No Checksum • HH = two digit hexadecimal number representing the calculated checksum |
| Carriage Return/Line Feed | <p>Terminates a message. The message will not be exchanged unless used in this order (CR LF).</p> |

3.5 Response Messages

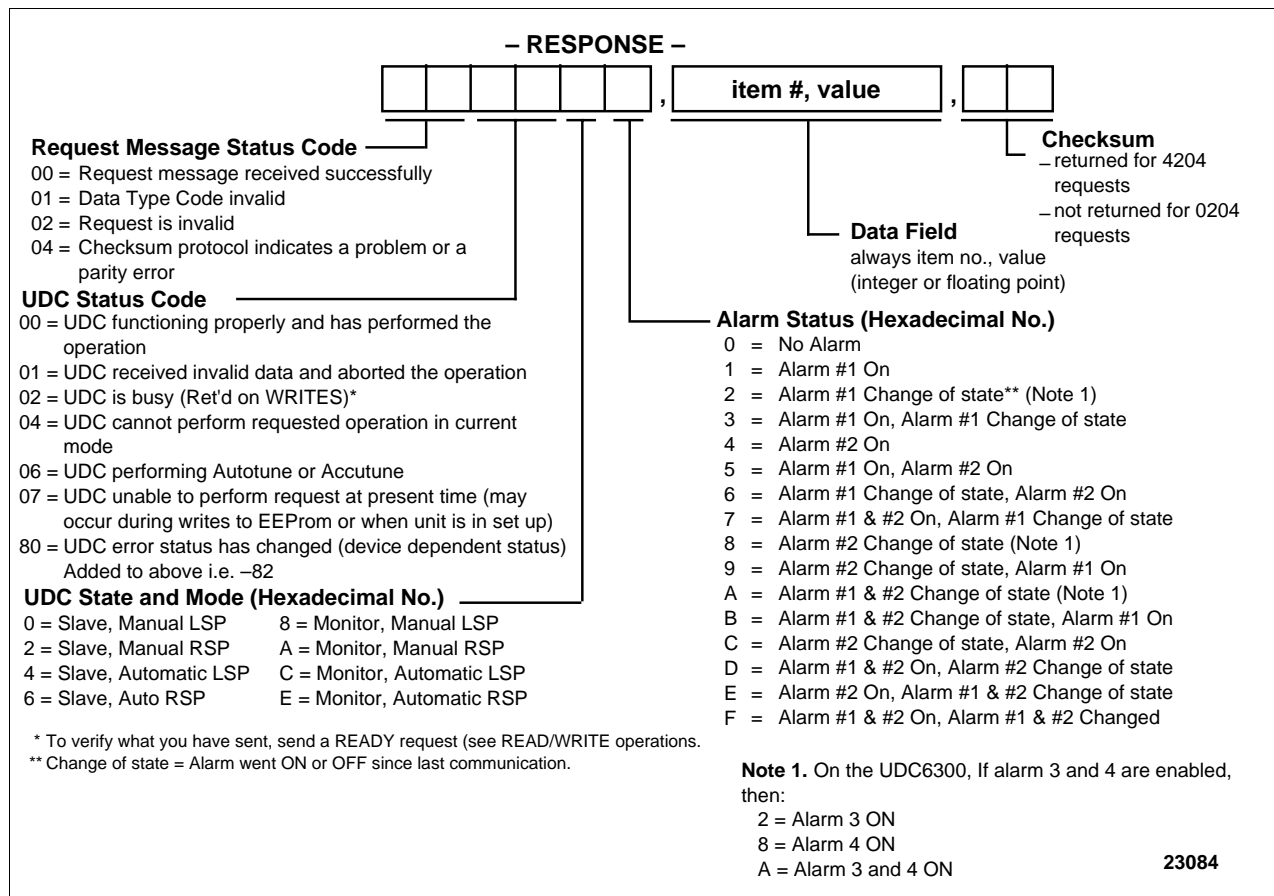
What is a response message?

The response message tells your computer the present status of the operation initiated by the request message. Response messages are composed of standard fields, separated by commas.

Response message fields

Each field contains a certain kind of information. Figure 3-3 indicates the response message fields and lists the information that could be returned in each field.

Figure 3-3 Response Message Fields Information



3.5 Response Messages, Continued

Response message field Information

Table 3-5 is a list of the information contained in the response message and their definitions.

Table 3-5 Response Message Fields Definitions

| Type of Information | Definition |
|------------------------------------|---|
| Request Message Status Code | A two digit code that indicates whether or not the present request message was successfully processed. For detailed explanations and recovery procedures for these codes, refer to 'Request Message Status Codes' in this section. |
| UDC Status Code | A two digit code that indicates whether or not the UDC controller addressed is working correctly and has performed the requested operation. For detailed explanations and recovery procedures for these codes, refer to "UDC Status Codes" in this sections. |
| UDC State and Mode | <p>A hexadecimal number that indicates whether the UDC controller's present state is "Slave" or "Monitor" and whether it is in Manual or Automatic mode using the Local setpoint or Remote setpoint.</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">ATTENTION</div> Any change made in UDC State or Control mode will not be indicated in the response until the next transaction. |
| Alarm Status | A hexadecimal number that indicates the status of Alarm #1 and #2 or both. It indicates when the Alarm is on or has changed state since last communication. The change of state indicator is a backup to the on/off state indicator. If an alarm goes from off to on then off in between consecutive communications, the on/off would not show it. The change of state flag would show that it had happened. |
| Data Field | This field always returns the identifying number for the parameter in the request message and the value for that parameter (either an integer or field floating decimal point). |
| Optional Checksum Field | This field is a one byte hexadecimal value (two ASCII characters) representing the binary sum, ignoring carries, generated by adding the ASCII code for each character of the response message, ignoring parity, up to but not including the checksum. It is returned for 4204 requests only. See "Checksum Protocol" in this section. |

3.6 Status Codes

Request message status codes

The codes, listed in Table 3-6, indicate whether or not the request message was successfully processed. A suggested recovery procedure is listed for those that indicate an error.

Table 3-6 Request Message Status Codes

| Request Message Status Code | Explanation | Suggested Recovery |
|-----------------------------|--|---|
| 00 | The request message was successfully processed. | Not applicable. |
| 01 | Request message format invalid. | Check format of request message. Re-send message. |
| 02 | Request is invalid. The controller addressed does not support the requested operation. | Check parameter identifying code and value. |
| 04 | Checksum indicated in the request message differs from the checksum the UDC calculated. Or UDC has detected incorrect parity for character transmitted in request. | Check checksum calculations. Re-send message. |

3.6 Status Codes, Continued

UDC status codes All the controllers on the link return the UDC Status Codes listed in Table 3-7. A suggested recovery procedure is listed for those that indicate an error.

Table 3-7 UDC Status Codes

| UDC Status Code | Explanation | Example | Suggested Recovery |
|-----------------|--|--|---|
| 00 | UDC functioning properly and has received the message correctly. | | Not applicable. |
| 01 | UDC has received invalid data from the computer and did not perform the requested operation. | Data error: Configuration item number incorrect, data out-of-range or incorrect. | Check the UDC's configuration and limits. |
| 02 | UDC is busy until the data received is processed. | Returned after each write when a controller is processing a change to configuration database. | 1. Do ready request to see if information received. 2. Wait, then re-send request. |
| 04 | UDC cannot perform the requested operation in its current mode. | 1. Request error, request illegal, request incorrect in present state (Calib). 2. Requested illegal mode change. 3. Data received in wrong format. | Check configuration with last request. Check data field and data type field. |
| 06 | The UDC is performing Autotune or Adaptive Tune. | Returned when the controller is performing the Autotune or Adaptive Tune function. | Wait or stop Autotune/ Adaptive Tune, then re-send message. |
| 07 | UDC unable to perform request at present time. | May occur during writes to EEPROM or when unit is in set up and data changing via the keyboard. | Wait, re-send request. |
| +80 | UDC status change | Indicates one or more of the following have changed.* | Read 255 code. Clear by writing to 255 code. |

*Emergency manual, Failsafe, Working calibration checksum error, Configuration checksum error, Factory calibration error, Hardware failure, Restart after shed, Configuration/calibration memory changed.

3.7 Checksum Protocol (for Data Security)

Introduction

The optional Checksum Protocol is used to increase security on the RS422/485 link. This protocol enables both your computer and your UDC to detect messages that the RS422/485 link has transmitted inaccurately. Thus, this protocol makes the RS422/485 communications link more reliable.

CAUTION

Failure to use checksum protocol could make the undetected error rate for the RS422/485 link unacceptable for your process control application.

Using checksum protocol

You can use the checksum protocol with any message exchange. The UDC uses the protocol to check the transmission of request messages. Your computer uses the protocol to check the transmission of response messages.

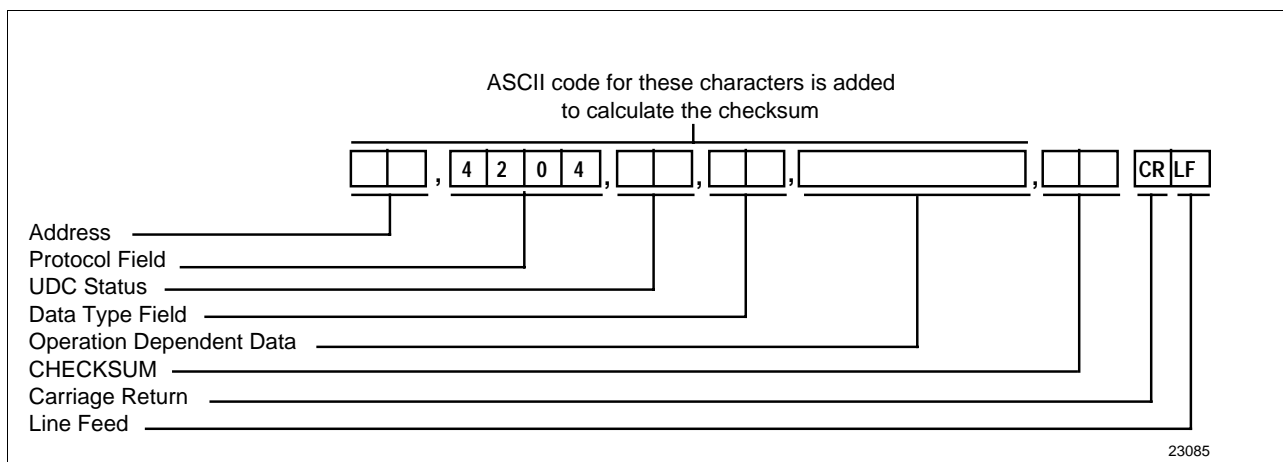
When a message exchange includes checksum protocol:

- Your UDC can tell, with high probability, if the ASCII code in the request message has changed during transmission from your computer.
- Your computer can tell, with high probability, if the ASCII code in the response message has changed during transmission from the UDC.

To use Checksum Protocol, you change the format of the request message as shown in Figure 3-4 as follows:

- You use a 4204 in the request format.
- You insert a 2-digit Hexadecimal number that represents the checksum that you have calculated from the ASCII codes in the request message as explained in “Calculating the Checksum”. See Section 12 for an ASCII Conversion table and a Hexadecimal Binary table.

Figure 3-4 Request Format for Checksum Protocol



3.7 Checksum Protocol (for Data Security), Continued

Calculating the Checksum

Table 3-8 lists the procedure for calculating the checksum. See Figure 3-5 for an example.

Table 3-8 Calculating the Checksum Procedure

| Step | Action |
|------|--|
| 1 | Take the binary sum, ignoring carries generated by the most significant bits, of the ASCII code for each of the message's characters, ignoring parity, up to but not including the CHECKSUM field and the CR and LF characters. The final sum should be an 8-bit binary number. See Section 12 for ASCII Conversion table and Hexadecimal to Binary table. |
| 2 | Convert the four least significant bits of this sum to the equivalent hexadecimal digit. This becomes the least significant digit in the CHECKSUM field. |
| 3 | Convert the four most significant bits of this sum to the equivalent hexadecimal digit. This becomes the most significant digit in the checksum field. |

3.7 Checksum Protocol (for Data Security), Continued

Checksum calculation example Figure 3-5 shows an example of the result of a checksum calculation according to instructions in Table 3-8.

Figure 3-5 Example of Checksum Calculation

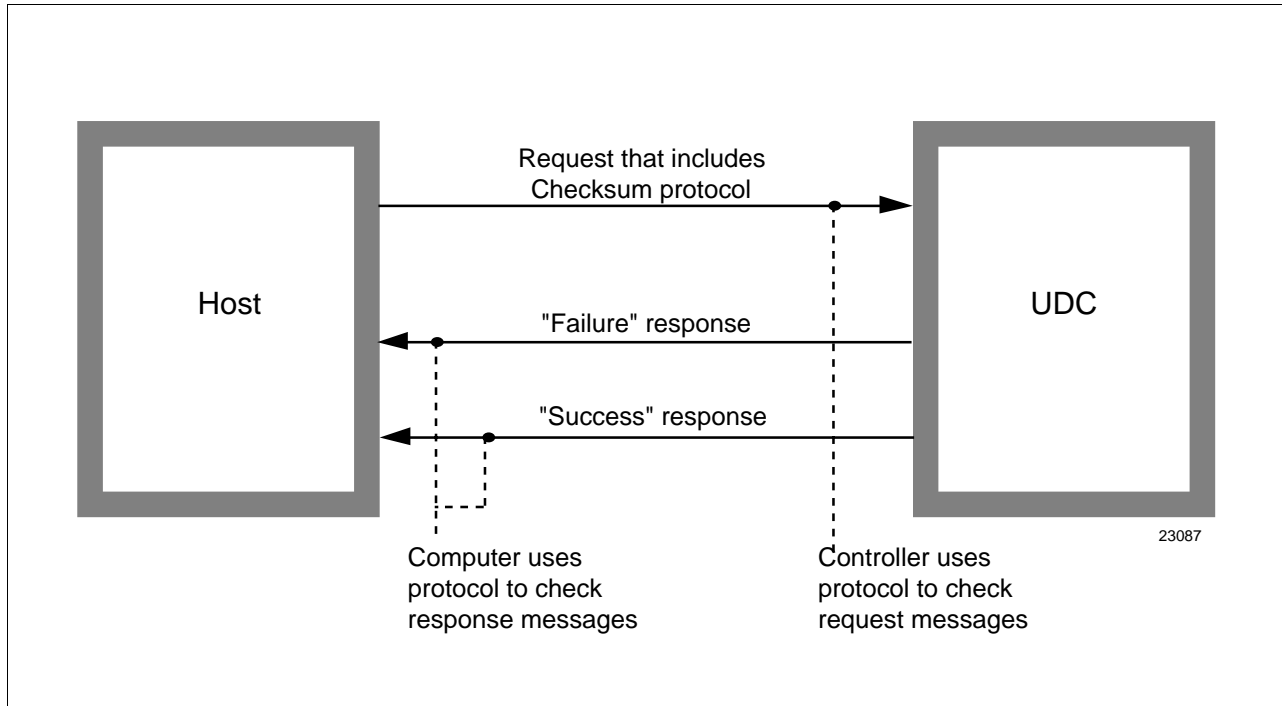
| Example | | |
|-----------------------------------|------|--------------|
| 03,4204,E4,18,001,7C CR LF | | |
| 0 | 0011 | 0000 |
| 3 | 0011 | 0011 |
| | 0110 | 0011 |
| , | 0010 | 1100 |
| | 1000 | 1111 |
| 4 | 0011 | 0100 |
| | 1100 | 0011 |
| 2 | 0011 | 0010 |
| | 1111 | 0101 |
| 0 | 0011 | 0000 |
| | 0010 | 0101 |
| 4 | 0011 | 0100 |
| | 0101 | 1001 |
| , | 0010 | 1100 |
| | 1000 | 0101 |
| E | 0100 | 0101 |
| | 1100 | 1010 |
| 4 | 0011 | 0100 |
| | 1111 | 1110 |
| , | 0010 | 1100 |
| | 0010 | 1010 |
| 1 | 0011 | 0001 |
| | 0101 | 1011 |
| 8 | 0010 | 1000 |
| | 1001 | 0011 |
| , | 0010 | 1100 |
| | 1011 | 1111 |
| 0 | 0011 | 0000 |
| | 1110 | 1111 |
| 0 | 0011 | 0000 |
| | 0001 | 1111 |
| 1 | 0011 | 0001 |
| | 0101 | 0000 |
| , | 0010 | 1100 |
| | 0111 | 1100 |
| Hex → | 7 | C (Checksum) |

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3.7 Checksum Protocol (for Data Security), Continued

Success or failure After receiving a request that uses checksum protocol, the UDC calculates the checksum of the characters received and compares this to the hexadecimal number stated in the checksum field. Depending on whether the checksums agree, the UDC returns either the “success” or “failure” response. Figure 3-6 indicates what happens when checksum protocol is used.

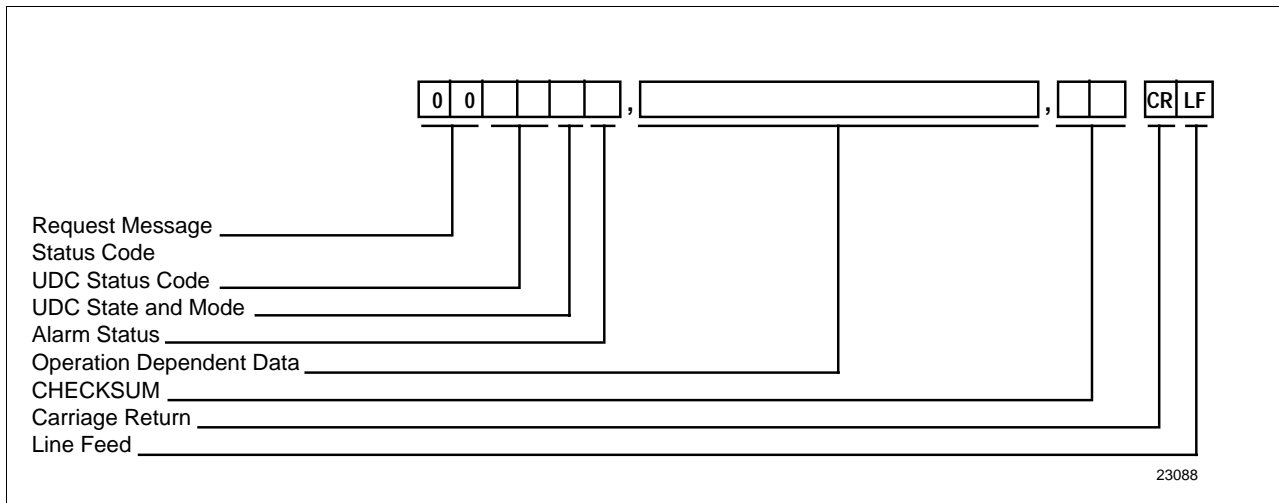
Figure 3-6 Using Checksum Protocol



3.7 Checksum Protocol (for Data Security), Continued

Success response If the checksums agree – and no other problems are encountered – the UDC returns the success response beginning with Request Message Status Code 00. Figure 3-7 indicates this response.

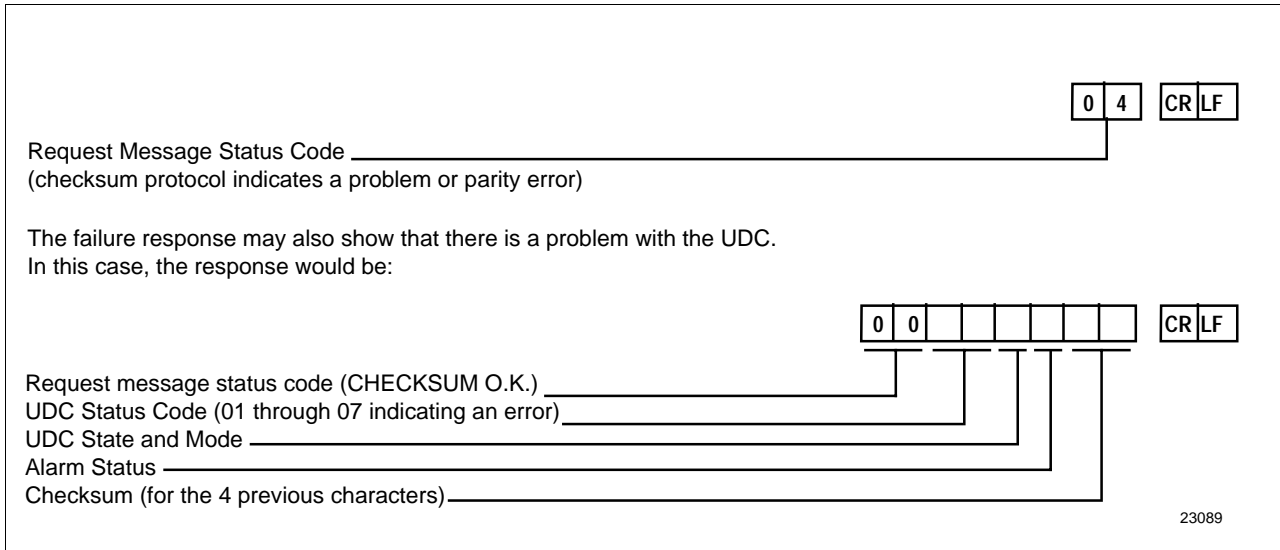
Figure 3-7 “Success Response” Message Fields



3.7 Checksum Protocol (for Data Security), Continued

Failure response If the checksums disagree, UDC ignores the request and returns the failure response Request Message Status Code 04. To recover, your computer repeats the operation. Figure 3-8 indicates this response.

Figure 3-8 “Failure Response” Message Fields



Checksum Calculation After receiving a response that has checksum protocol, your computer should perform the checksum calculations on the characters received, and compare the results to the checksum in the response message. If the checksums disagree, your computer should repeat the operation.

ATTENTION

If there is a problem with the UDC itself, a UDC Status Code indicating an error will be returned.

3.8 Shed

| | |
|--|--|
| What is Shed? | <p>Shed happens when the controller, which has been working in "Slave," reverts to "Stand Alone" mode. Upon receiving a "Slave" message, the controller resets the "SHED TIMER." If this timer expires before the next valid message, the controller goes to stand alone operation. When the host reconnects with a valid message, the response will indicate as 8 at the third digit to indicate a restart after shed.</p> <p>Thus SHED acts as a safeguard in case the computer or communications link fail. If something prevents the computer from communicating with the controller the device returns to the local control mode. The local operator is then able to regain control over the controller and operate it by the keyboard.</p> |
| Shed time | <p>Shed Time works like a timer. The number selected will represent how many sample periods there will be before the controller sheds from computer control. You can configure the shed time to be one that is between 1/3 second and approximately 83 seconds. 0 = No Shed.</p> |
| Shed controller mode and output level | <p>This determines the mode of local control whenever the controller is shed from the communication link.</p> |
| Shed setpoint recall | <p>This determines what setpoint will be used if the controller is shed from the communications link.</p> |
| How to enter this information | <p>Refer to "Preparing the Controller for Communications" in this section for these selections and procedure for entering the information into the controller.</p> |

3.9 Loopback (UDC 2300, UDC 3000, UDC 3300 Only)

Making sure all the UDC 2300/3000/3300 controllers are on-line

Once you have established communications between the UDC 2300/3000/3300 controller and your computer and understand the message exchange, it is a good idea to test communications to all the controllers on the RS422/485 link. The LOOPBACK operation is an easy way to do this. By including the appropriate address in the loopback operation, you can send a series of characters from your computer to any device on the link.

After receiving these characters, the device addressed "echoes" back the same characters. By comparing the characters sent to those returned, you can tell whether communications are working correctly.

Loopback message exchange

With this message exchange, you can test the communication link between your computer and any controller.

- In the request message, your computer sends a series of characters to the desired device.
- In the response message, the device returns the characters it received to your computer.

Request message

Table 3-9 is an example of the Loopback Request Message with or without the checksum.

Table 3-9 Example of Loopback Request Message

| Protocol | Message Format |
|-------------------------|---|
| With Checksum | AA,4204,E8,DD,123456789ABC,CS CR LF (12 characters max.) |
| Without Checksum | AA,0204,E8,DD,123456789ABCDE, CR LF (14 characters max.) <i>Where:</i> AA = Status Address |

3.9 Loopback, Continued

Response message Table 3-10 is an example of the Loopback Response Message with or without the checksum.

Table 3-10 Example of Loopback Response Message

| Protocol | Message Format |
|------------------|---|
| With Checksum | OOSSMA,123456789ABC,CS CR LF |
| Without Checksum | OOSSMA,123456789ABCDE, CR LF <i>Where:</i> OO = UDC Type Error SS = UDC Status M = Mode (Hex – see "Message Exchange") A = Alarm Data (Hex – see "Message Exchange") |

Programming example

The programming statements in Table 3-11 show how you could perform the LOOPBACK operation with the UDC controller that has station address 09– not using checksum.

If the LOOPBACK operation is successful, these statements would print OOOOMA,HELLO#09.

Where: M = Mode
A = Alarm Data

Table 3-11 Programming Example

| | Programming Statement | Result |
|-----------------|---|---|
| Request | 10 Write (5,20) 20 Format ("09,0204,E8,DD,HELLO#09") | Sending the LOOPBACK request message that contains the eight characters HELLO#09 to the controller with station address 09. |
| Response | 30 Read (6,40) Reply 40 Format (A15) 50 Write (7,60) Reply 60 Format (A15) | Receiving and printing the response message that contains the characters returned. |

3.10 Recovering from Communications Failures

What is a lost message?

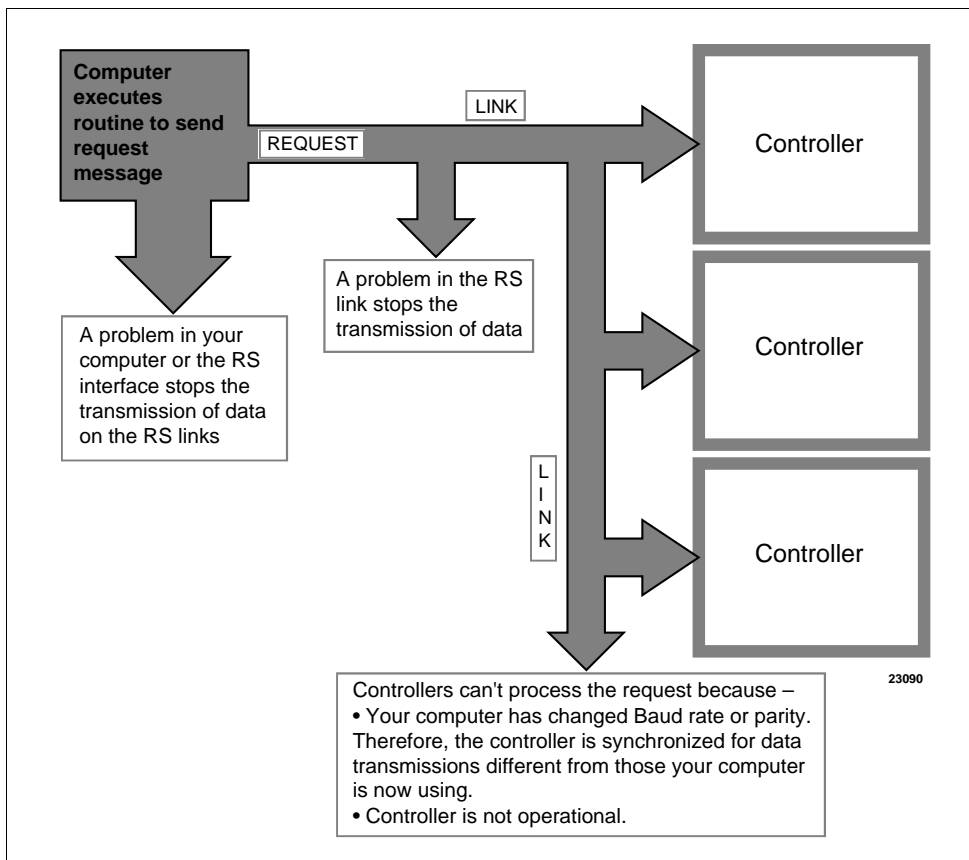
When your computer sends a request message but doesn't receive a response, a message (either the request or the response) has been lost on the link. As shown in Figure 3-9, problems in your computer, the link, or the controller could cause a message to get lost.

What happens to a lost message?

Depending on how your programming handles messages, a lost message could hang up your programming forever. Suppose your programming uses a high-level language input command (in Fortran, READ) to retrieve response messages from the input device or buffer fed by the link. Upon executing this input command, your computer goes to the input device to retrieve the response message and waits there until the data arrives. If a message is lost, the message exchange is never completed. Thus, the input command is left waiting for a response message that will never arrive.

As you can see, you must design your programming to handle the possibility that the messages will get lost on the link. Make sure that your programming includes a timing routine that detects the lost message and aborts the pending input command.

Figure 3-9 Lost Messages

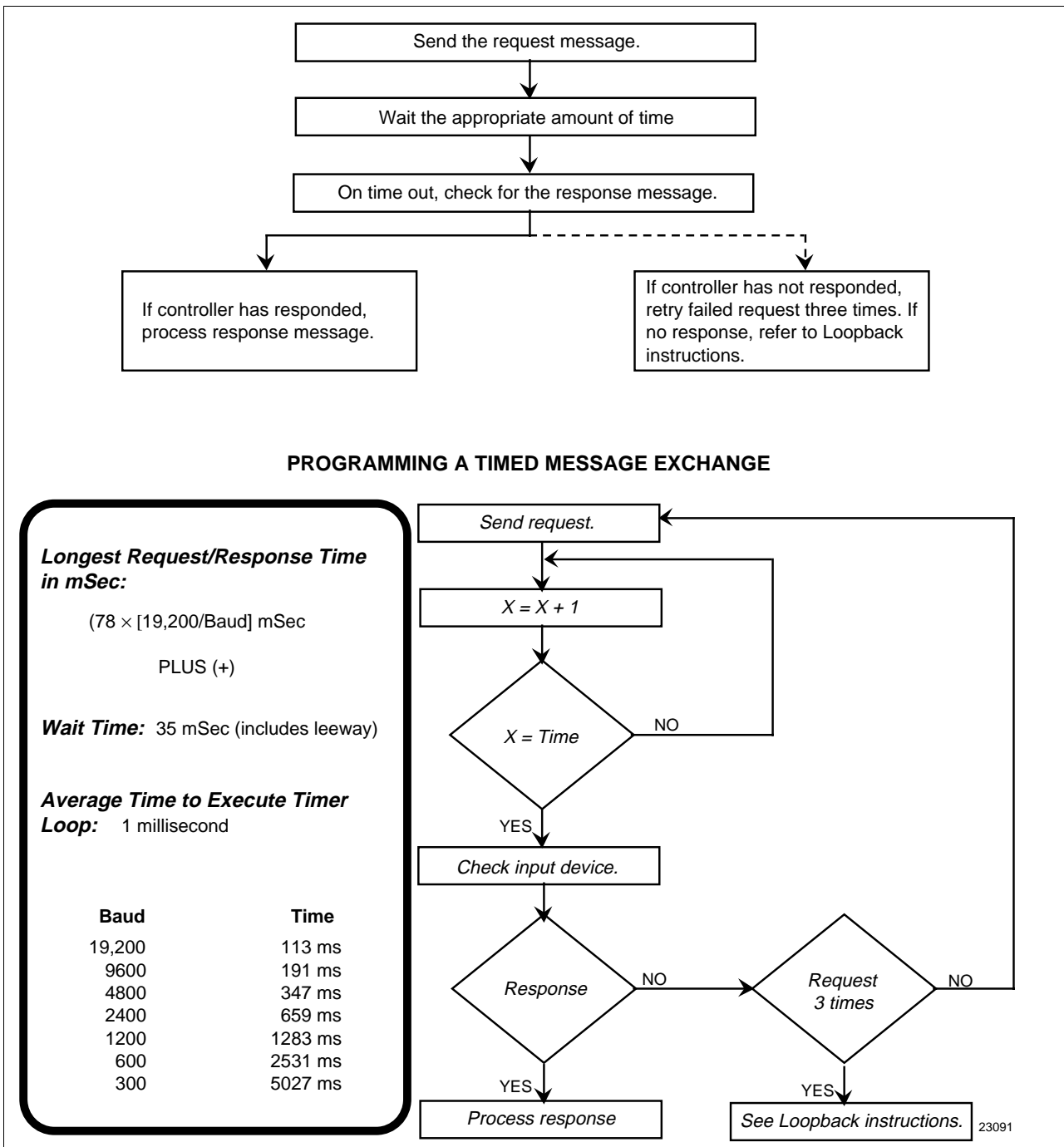


3.10 Recovering from Communications Failures, Continued

Timing message exchanges to detect lost messages

The flowchart in Figure 3-10 shows how to time a message exchange so that you can tell if a message has been lost. (This is only an example, not the suggested method.) Like all timing routines, this one includes a wait and a read interrupt (in Basic, a PEEK) rather than a standard input command.

Figure 3-10 Timing a Message Exchange and Checking for a Response



3.10 Recovering from Communications Failures, Continued

| | |
|-------------------------|--|
| Wait | The WAIT is the amount of time that your computer will wait for a response before assuming that a message has been lost. If the response doesn't appear in the allotted time, your computer should retry the request – up to three times. If your computer still hasn't gotten a response, your programming assumes that communications on the link have failed and calls the recovery or alarm routine. |
| Read Interrupt | The READ interrupt merely checks that input device or buffer for data, instead of waiting indefinitely until data arrives. |
| How long to wait | Before you can program a timing routine, you must determine how long to wait for a response. This wait must be at least as long as the response time for the longest message exchange when executed at your computer's baud rate. Also note that after the UDC has completed sending a response to your computer, it will require up to 1/3 second of additional processing time before it is ready to accept any new request message. If your computer sends a request to the UDC while it is still busy processing the previous request, it will respond with a BUSY status. Your computer can handle this situation by re-trying the request. |
| Timing routine | <p>Once you have established the appropriate wait time, you can program the timing routine. To do so, you loop an instruction until the desired wait time has elapsed, as shown in the figure on the previous page.</p> <p>This timing routine is the simplest one you could program. But, it is not efficient – your program waits the same amount of time for the shortest message as the longest. You devise a more efficient routine, such as a loop that checks for the response message each time "X" increments.</p> |

Section 4 – Read and Write Operations

4.1 Read Operations

Introduction

The Read operations (Data Retrieval) allow your computer to read data from any controller on the RS422/485 link. Data retrieval for each operation is accomplished through a message exchange between your computer and the device you are addressing.

You can request the data for only one identifying code at a time, but, the response may be a single variable or a three variable type depending on the code used.

Transaction states

Read transactions can be performed in either UDC state: Monitor or Slave.

ATTENTION Any change made in UDC state or control mode will not be indicated in the response until the next transaction.

Analog or digital

The parameters being read will be either Analog (codes 1 through 125) or Digital (Codes 128 through 255) value or selections so that all Read message formats must adhere to the standardization rules shown in the tables that follow.

4.2 Read Analog Parameters

Introduction The Analog identifying Codes are codes 001 through 125. Each of these codes are read using the Request and Response formats shown in tables 4-1 and 4-2.

Request format Table 4-1 lists the request format with or without checksum, for Analog I.D. Codes 001 through 125.

Where:

AA = Station Address (Each loop of a 2-loop controller has a unique address – see "Message Exchange")
X = UDC State and Mode (Hex – see "Message Exchange")
NNN = Identifying Code for Analog Parameter (001 to 125)
CS = Checksum Value (2 digit hex – see "Checksum")
CR = Carriage Return
LF = Line Feed

Table 4-1 Analog Parameter Request Format

| Format Type | Format |
|-------------------------|-------------------------------------|
| With Checksum | AA, 4204, X4, 18*, NNN, 0, CS CR LF |
| Without Checksum | AA, 0204, X4, 18*, NNN, 0, CR LF |

*Use 48 for extended analog configuration I.D. codes (001 to 043), UDC 3300, UDC 6000, UDC 6300 only.

4.2 Read Analog Parameters, Continued

Response format

Table 4-2 lists the response format, single or three variable with or without checksum, for Analog I.D. Codes 1 through 125.

Where:

OO = UDC Type Error (00 = No Error)
SS = UDC Status
M = Mode (Hex – see "Message Exchange")
A = Alarm Data (Hex – see "Message Exchange")
NNN = Identifying Code for Analog Parameter
DDD.D = Floating Point Value
CS = Checksum (two digit hex – see "Checksum")
CR = Carriage Return
LF = Line Feed

Table 4-2 Analog Parameter Response Format

| Variable | Format Type | Format |
|---------------|------------------|---|
| Single | with checksum | OOSSMA, NNN, DDD.D, CS, CR LF (see note 1) |
| | without checksum | OOSSMA, NNN, DDD.D, CR LF (see note 1) |
| Three | with checksum | OOSSMA, NNN, DDD.D, DDDD, DDD.D, CS, CR LF (see note 1) |
| | without checksum | OOSSMA, NNN, DDD.D, DDD.D, DDDD.,CR LF (see note 1) |

Note 1. Floating point values may look like this:

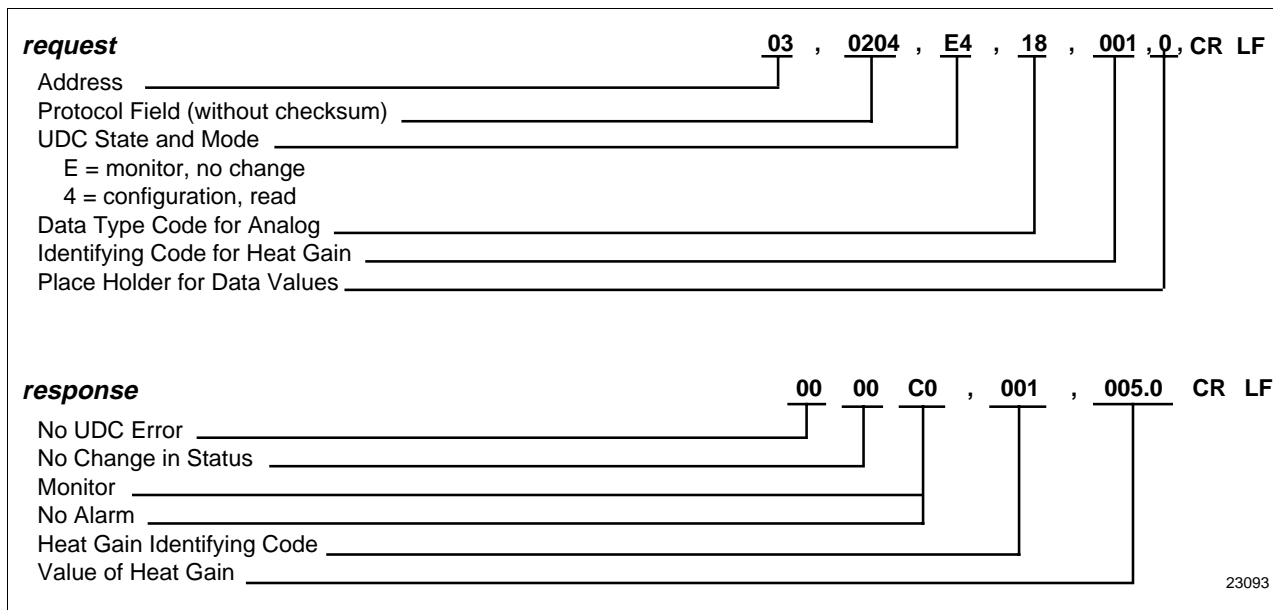
| | | | |
|--------|-------|--------|--------|
| DDDD. | DDD.D | DD.DD | D.DDD |
| -DDD.D | -DDD. | -DD.DD | -D.DDD |

They must have four characters and one decimal point as shown, negative sign as an extra character.

4.2 Read Analog Parameters, Continued

Example Figure 4-1 is an example of a Read Analog Parameter message exchange; specifically, Read the value of heat gain; Analog I.D. Code 001.

Figure 4-1 Read Analog Parameter Message Exchange



4.3 Read Digital Parameters

Introduction The Digital identifying codes are Codes 128 through 255. Each of these codes are read using the Request and Response formats shown in Tables 4-3 and 4-4.

Request format Table 4-3 lists the request format, with or without checksum, for digital I.D. Codes 128 through 255.

Where:

AA = Station Address (Each loop of a 2 loop controller has a unique address – see "Message Exchange")
X = UDC State and Mode (Hex – see "Message Exchange")
MMM = Identifying Code for Digital Parameter (128 to 255)
CS = Checksum Value (two digit hex – see "Checksum")
CR = Carriage Return
LF = Line Feed

Table 4-3 Digital Parameter Request Format

| Format Type | Format |
|-------------------------|--------------------------------------|
| With Checksum | AA, 4204, X4, 11*, MMM, 0, CS, CR LF |
| Without Checksum | AA, 0204, X4, 11*, MMM, 0, CR LF |

*Use 41 for extended digital configuration I.D. codes (128 to 158), UDC 3300, UDC 6000, UDC 6300 only.

4.3 Read Digital Parameters, Continued

Response format Table 4-4 lists the response format, with or without checksum, for digital I.D. codes 128 through 255.

Where:

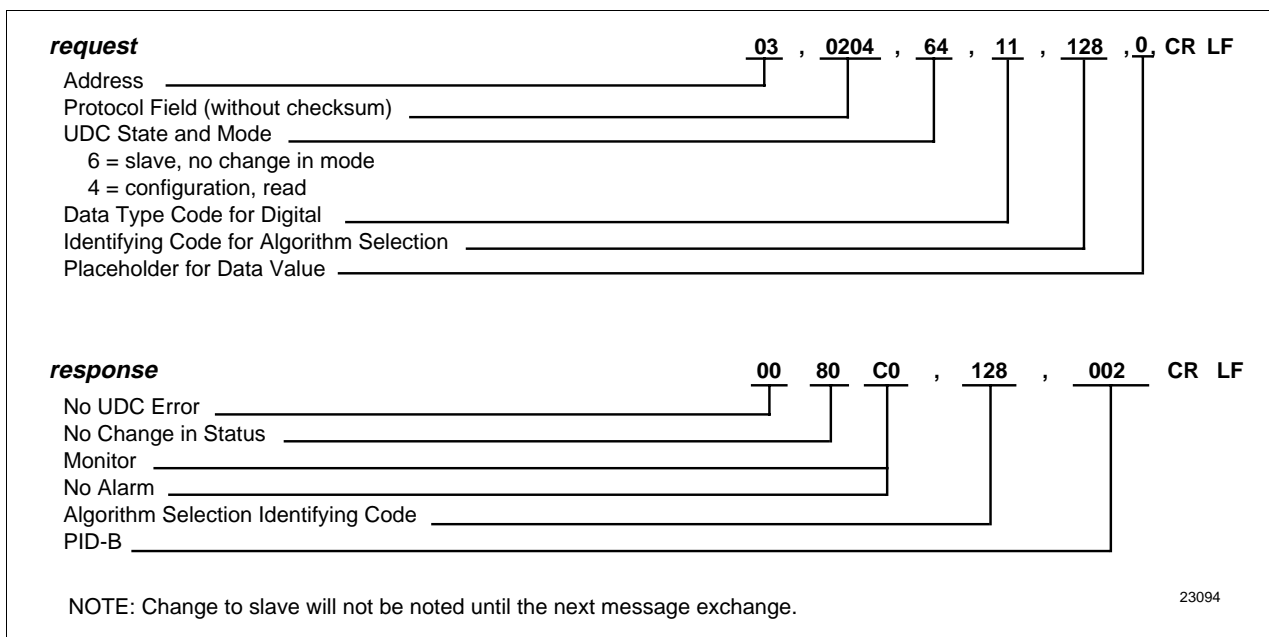
OO = UDC Type Error (00 = No Error)
 SS = UDC Status
 M = Mode (Hex – see "Message Exchange")
 A = Alarm Data (Hex – see "Message Exchange")
 MMM = Identifying Code for Digital Parameter
 DDD = Digital Value (always 3 characters)
 CS = Checksum (2 digit hex – see "Checksum")
 CR = Carriage Return
 LF = Line Feed

Table 4-4 Digital Parameter Response Format

| Format Type | Format |
|------------------|----------------------------|
| With Checksum | OOSSMA, MMM, DDD, CS CR LF |
| Without Checksum | OOSSMA, MMM, DDD, CR LF |

Example Figure 4-2 is an example of a Read Digital Parameter message exchange; specifically, read the algorithm selection: digital I.D. Code 128 and maintain or change the UDC state to slave.

Figure 4-2 Read Digital Parameter Message Exchange



4.4 Write Operations

Introduction

The Write operations allow your computer to write data type transactions such as Overriding the PV, Setpoint, inputs as well as writing configuration data such as Tuning Parameters, Algorithm Selection, Setpoint Ramp Information, etc. to the controller.

Transaction state

Write transactions can only be performed in the Slave Mode.

Write message exchange

In a Write transaction, only single items are permitted to be written.

A Ready transaction is required to determine if the information was received.

Following any Write, a Busy indication is returned.

Table 4-5 lists the steps for the Write message exchange.

Table 4-5 Write Message Exchange Steps

| Step | Action |
|------|---|
| 1 | Do a Write request to change a parameter (see Table 4- 6). |
| 2 | Receive a Busy response (see Table 4-7). |
| 3 | Send Ready request to see if the information has been processed (see Table 4-8). |
| 4 | Receive an "Is Ready" response (see Table 4-9). |
| 5 | Do a Read request to check the value (OPTIONAL). |

CAUTION

The data stored in non-volatile memory is expected to be retained for 10 years. However, additional writes will degrade the retentivity of the non-volatile memory.

ATTENTION

Any change made in UDC State or Control Mode will not be indicated in the response until the next transaction.

4.5 Write Analog Parameters

Introduction

The analog identifying codes are codes 001 through 125. The Write request and response formats are shown in Tables 4-6, 4-7, 4-8, and 4-9.

Request format

Table 4-6 lists the write request format with or without checksum for Analog I.D. Codes 1 through 125.

Where:

- AA = Station Address (Each loop of a 2 loop controller has a unique address – see "Message Exchange")
- X = UDC State and Mode (Hex – see "Message Exchange")
- NNN = Identifying Code for Analog Parameter (001 to 125)
- DDD.D = Floating Point Value (see note 1)
- CS = Checksum Value (two digit hex – see "Checksum")
- CR = Carriage Return
- LF = Line Feed

Table 4-6 Write Request Format for Analog I.D. Codes

| Format Type | Format |
|-------------------------|--|
| With Checksum | AA, 4204, X5, 18*, NNN, DDD.D, CS CR LF (see note 1) |
| Without Checksum | AA 0204, X5, 18*, NNN, DDD.D, CR LF (see note 1) |

*Use 48 for extended analog I.D. codes 001 through 043, UDC 3300, UDC 6000, or UDC 6300 only.

Note 1 Floating point values may look like this:

| | | | |
|--------|-------|--------|--------|
| DDDD. | DDD.D | DD.DD | D.DDD |
| -DDD.D | -DDD. | -DD.DD | -D.DDD |

They must have four characters and one decimal point as shown, negative sign as an extra characters.

4.5 Write Analog Parameters, Continued

“Busy” response

If the controller did not process the information, the controller will return a four digit status code indicating an error in the third and fourth digit. See “Status Codes.”

Table 4-7 lists the busy response that can be received, with or without checksum, after a Write request that indicates a good write:

Where:

M = Mode (Hex - see “Message Exchange”)
A = Alarm Data (Hex – see "Message Exchange")
CS = Checksum (two digit hex – see "Checksum")
CR = Carriage Return
LF = Line Feed

Table 4-7 “Busy” Response

| Format Type | Format |
|------------------|-------------------|
| With Checksum | 0002MA, CS, CR LF |
| Without Checksum | 0002MA, CR LF |

“Ready” request

After receiving a “Busy” response, enter a “Ready” request. Table 4-8 lists the “Ready” request format, with or without checksum.

Table 4-8 Ready Requests

| Format Type | Format |
|------------------|-------------------------------|
| With Checksum | 03, 4204, 66, 11, 0, CS CR LF |
| Without Checksum | 03, 0204, 66, 11, 0, CR LF |

4.5 Write Analog Parameters, Continued

“Is Ready” response This is the response to a Ready request. Table 4-9 lists the “Is Ready” response formats, with or without checksum.

Where:

SS = UDC Status
M = Mode (Hex - see “Message Exchange”)
A = Alarm Data (Hex – see "Message Exchange")
CS = Checksum (two digit hex – see "Checksum")
CR = Carriage Return
LF = Line Feed

Table 4-9 “Is Ready” Response

| Format Type | Format |
|------------------|-------------------|
| With Checksum | 00SSMA, CS, CR LF |
| Without Checksum | 00SSMA, CR LF |

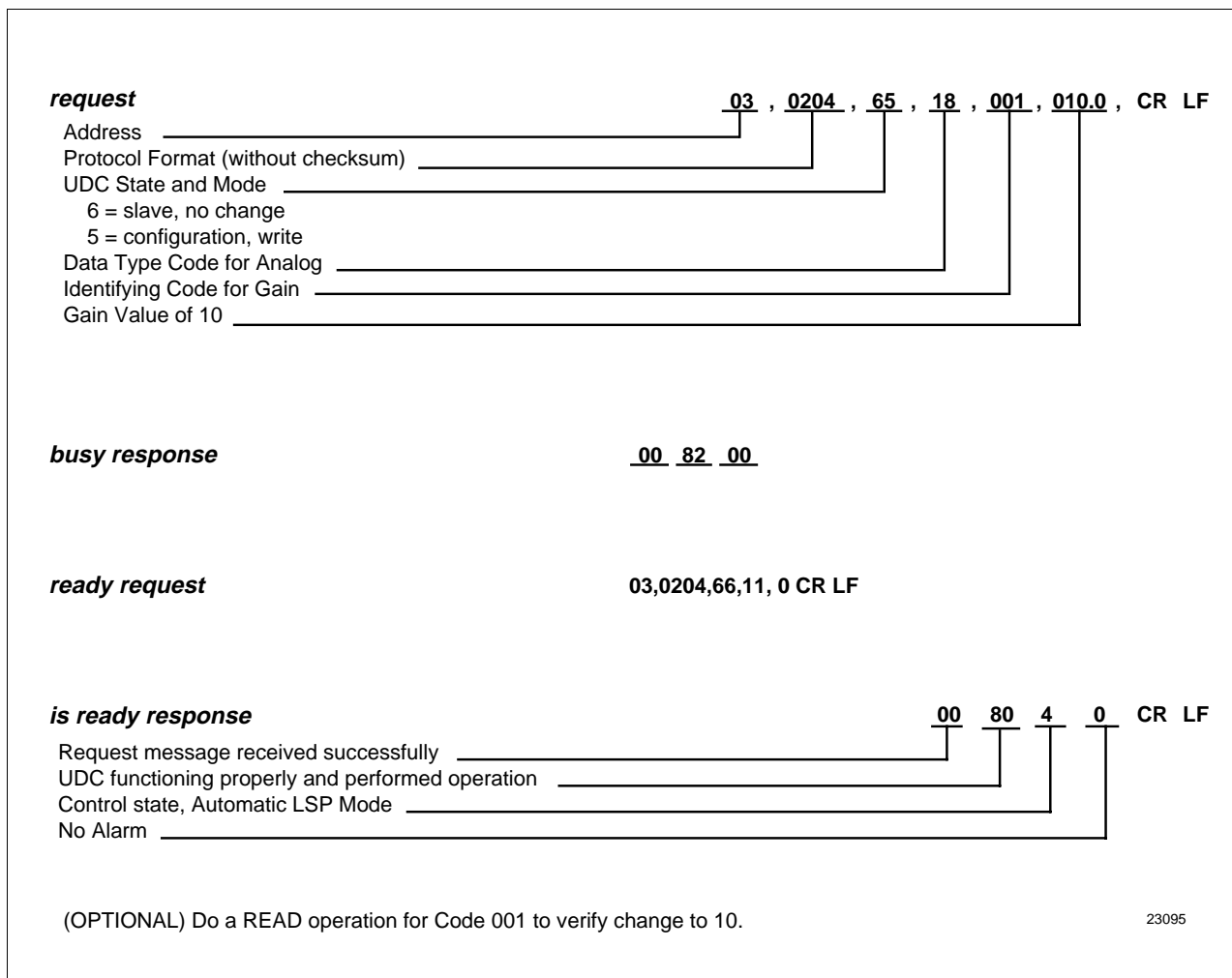
Check write transaction

To check the value a change do a “Read” for the particular parameter (I.D. Code) you have changed.

4.5 Write Analog Parameters, Continued

Example Figure 4-3 is an example of a Write of an analog parameters message exchange; specifically to change the gain value from 5 to 10; analog I.D. Code 001.

Figure 4-3 Write Analog Parameter Message Exchange Example



4.6 Write Digital Parameters

Introduction The digital identifying codes are Codes 128 through 225. The Write request and response formats are shown in Tables 4-10, 4-11, 4-12, and 4-13.

Request format Table 4-10 lists the Write request format, with or without checksum, for digital I.D. Codes 128 through 255.

Where:

AA = Station Address (Each loop of a 2 loop controller has a unique address – see "Message Exchange")
X = UDC State and Mode (Hex – see "Message Exchange")
MMM = Identifying Code for Digital Parameter (128 to 255)
DDD = Digital Value (always three characters)
CS = Checksum Value (two digit hex – see "Checksum")
CR = Carriage Return
LF = Line Feed

Table 4-10 Write Request Format for Digital I.D. Codes

| Format Type | Format |
|-------------------------|---------------------------------------|
| With Checksum | AA, 4204, X5, 11*, MMM, DDD, CS CR LF |
| Without Checksum | AA, 0204, X5, 11*, MMM, DDD, CR LF |

*Use 41 for extended digital I.D. codes 128 through 159, UDC 3300, UDC 6000, or UDC 6300 only.

“Busy” response If the controller did not process the information, the controller will return a four digit status code, indicating an error in the third and fourth digit. See “Status Codes.”

Table 4-11 lists the busy responses that can be received with or without checksum, after a write request that indicates a good write:

Where:

M = Mode (Hex - see “Message Exchange”)
A = Alarm Data (Hex – see "Message Exchange")
CS = Checksum Value (2 digit hex – see "Checksum")
CR = Carriage Return
LF = Line Feed

4.6 Write Digital Parameters, Continued

**“Busy” response,
continued**

Table 4-11 Busy Response

| Format Type | Format |
|-------------------------|-------------------|
| With Checksum | OOO2MA, CS, CR LF |
| Without Checksum | OOO2MA, CR LF |

“Ready” request

After receiving a “Busy” response, enter a “Ready” request. Table 4-12 lists the “Ready” request format, with or without checksum.

Table 4-12 Ready Request

| Format Type | Format |
|-------------------------|------------------------------|
| With Checksum | 03, 4204, 66, 11, 0 CS CR LF |
| Without Checksum | 03, 0204, 66, 11, 0 CR LF |

“Is Ready” response

This is the response to the Ready request. Table 4-13 lists the “Is Ready” response formats, with or without checksum.

Where:

- SS = UDC Status
- M = Mode (Hex - see “Message Exchange”)
- A = Alarm Data (Hex – see "Message Exchange")
- CS = Checksum Value (two digit hex – see "Checksum")
- CR = Carriage Return
- LF = Line Feed

Table 4-13 “Is Ready” Response

| Format Type | Format |
|-------------------------|-------------------|
| With Checksum | 00SSMA, CS, CR LF |
| Without Checksum | 00SSMA, CR LF |

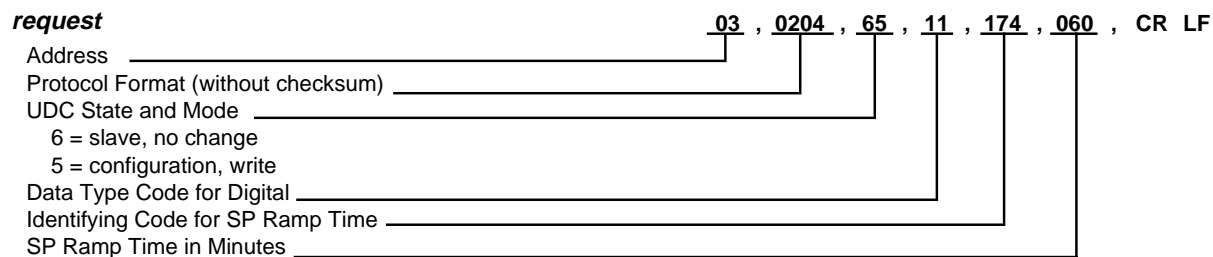
**Check write
transaction**

To check the value of a change, do a “Read” for the particular (I.D. Code) you have changed.

4.6 Write Digital Parameters, Continued

Example Figure 4-4 is an example of a Write of a digital parameter message exchange; specifically, to change the setpoint ramp time to 60 minutes (Code 174).

Figure 4-4 Write Digital Parameter Message Exchange Example



busy response 00 82 00

```
ready request                                03,0204,66,11,000,0 CR LF
```

| is ready response | | | | 00 | 00 | 4 | 0 | CR | LF |
|--|--|--|--|-----------|-----------|----------|----------|-----------|-----------|
| Request message received successfully | | | | | | | | | |
| UDC functioning properly and performed operation | | | | | | | | | |
| Control state, Automatic LSP Mode | | | | | | | | | |
| No Alarm | | | | | | | | | |

(OPTIONAL) Do a READ operation for Code 174 to verify change.

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Section 5 – Read, Write and Override Parameters on UDC 3000 Versa-Pro Controllers

5.1 Overview

Introduction

This section contains information concerning reading, writing, and overriding parameters on the UDC 3000 Controllers. There are two types of parameters:

- Data Transfer—these parameters include reading control data, option status, and reading or changing setpoints or outputs.
- Configuration Data—all the configuration data is listed in the order in which it appears in the controller.

Each type of parameter has the identifying codes listed with it. Follow the message exchange rules listed in “Read and Write Operations.”

What's in this section

This section contains the following topics:

| Topic | | See Page |
|-------|---|----------|
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| 5.2 | Reading Control Data | 57 |
| 5.3 | Option Status | 58 |
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5.1 Overview - UDC 3000, Continued

What's in this section, continued

| Topic | | See Page |
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General information

Analog Parameters

- Whenever analog parameters 001 through 107 (those that can be changed via Communications) are changed, a write cycle occurs immediately after receipt of the message.

Override Parameters

- Override analog parameters 123, 124, and 125 (computer setpoint, output, and input) are not stored in non-volatile memory and can be changed as frequently as desired with no effect on non-volatile memory retentivity, but the controller must remain in slave mode.

Digital Parameters

- Whenever digital configuration parameters 128 through 250 are updated via communications, the non-volatile memory is updated as soon as the message is received.

5.2 Reading Control Data - UDC 3000

Overview

You can Read the following control data from the UDC 3000 controller.

- Input 1
- Input 2
- PV
- Internal RV
- PV, Setpoint, Output

I.D. codes

Use the identifying codes listed in Table 5-1 to read the specific items.
A Write request for these codes will result in an Error message.

Table 5-1 Control Data Parameters

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|------------------------------------|
| Input #1 | 118 | 18 | In Engineering Units or Percentage |
| Input #2 | 119 | 18 | In Engineering Units or Percentage |
| PV | 120 | 18 | In Engineering Units or Percentage |
| Internal RV | 121 | 18 | In Engineering Units or Percentage |
| PV, Setpoint, and Output* | 122 | 18 | In Engineering Units or Percentage |

*This READ request will give a three variable response (see READ/WRITE operation).

5.3 Read Option Status - UDC 3000

Read

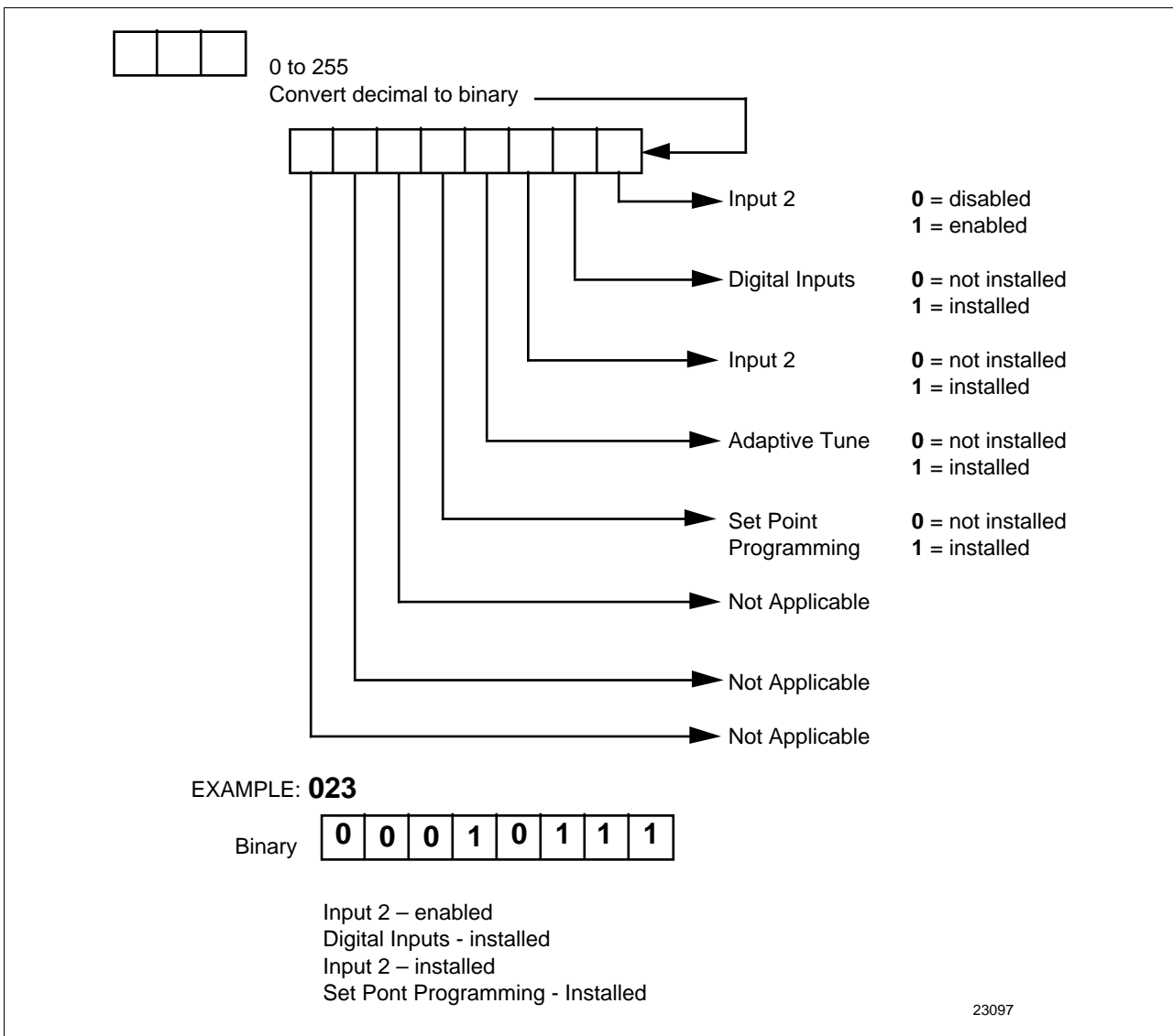
Doing a Read of I.D. Code 185 listed in Table 5-2 will tell you which of the available options are enabled/installed or disabled/not installed.

Table 5-2 Option Status

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|--------------------|
| Option Status (read only) | 185 | 11 | See Figure 5-1 |

The data field in the response message will be a decimal number from 0 to 255. Convert the decimal number to binary as shown in Figure 5-1 to determine which options are or are not active.

Figure 5-1 Option Status Information



5.4 Miscellaneous Read Only's - UDC 3000

I.D. codes for read only's

The identifying codes listed in Table 5-3 represent some parameters that are Read only. No Writes allowed.

Table 5-3 Miscellaneous Read Only's

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------------|------------------|-------------|--|
| Output Current Calibration 0% | 33 | 18 | READ only |
| Output Current Calibration 100% | 34 | 18 | READ only |
| Software Type | 157 | 11 | READ only 31 = Basic UDC 3000 32 = Field upgrade for Adaptive Tune 33 = Field upgrade for Adaptive Tune + Setpoint Programming 37 = Limit Controller |
| Software Version | 167 | 11 | 0 to 225 |
| UDC Error Status | 255 | 11 | See below READ/WRITE* 001 = Emergency Manual 002 = Failsafe 004 = Working Calibration Checksum Error 008 = Configuration Checksum Error 016 = Parameter Limit Indicator 032 = Hardware Failure 064 = Restart after Shed 128 = Configuration/Calibration Memory Changed |

*Write to clear.

FOR EXAMPLE: If Read returns 192 (restart after shed-064 plus configuration change -128)

Write 192 to 255

Read returns 000 (clear)

5.4 Miscellaneous Read Only's - UDC 3000, Continued

Error status definitions

Table 5-4 lists the UDC error status codes and their definitions.

Table 5-4 Error Status Definitions

| Status Code | Error | Definitions |
|-------------|---|--|
| 001 | Emergency Manual | Indicates that the output of the unit which has been in slave operation, is under manual control, locally. Error remains until local control is relinquished at the controller. |
| 002 | Failsafe | Error occurs whenever the control reverts to failsafe operation and remains as long as the condition exists. |
| 004 | Working Calibration Checksum Error | Indicates that an error exists in the working calibration data. Re-select the inputs to load factory calibration data or field calibrate the inputs. |
| 008 | Configuration Checksum Error | Error exists in the configuration data. Verify configuration data at the keyboard. Checksum will be recomputed by stepping the controller through the status tests. |
| 016 | Parameter Limit Indicator | A limit condition exists on one of the following: PV, RV, Input 1, Input 2, Input 3, Computer Setpoint. User must determine EXACT limit condition and correct. |
| 032 | Hardware Failure | Indicates either a RAM test failure or Input 1, Input 2, Input 3 failure on two consecutive conversions. |
| 064 | Restart After Shed | Error occurs whenever a shed of slave override is performed. Error is reset following a WRITE command to I.D. Code 255 (064). |
| 128 | Configuration /Calibration Memory Changed | Error occurs whenever shed, configuration, or calibration changed. Also occurs whenever there is a change of state in 001, 002, 004, 008, or 016. Error is reset following a WRITE command to I.D. Code 255. |

5.5 Setpoints - UDC 3000

Overview

You can use two separate setpoints in the UDC 3000 Controller. The identifying codes listed in Table 5-5 allow you to select which setpoint you want to use and to enter a value in Engineering Units or Percent (whichever is selected at Code 161) for that setpoint via communications.

I.D. codes

Make your selection using I.D. Code 173 and enter the value for the setpoint chosen using I.D. Code 39 (SP 1) or 53 (SP 2).

Table 5-5 Setpoint Code Selections

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| Local Setpoint #1 | 39 | 18 | Value within the setpoint range limits |
| Local Setpoint #2 | 53 | 18 | Value within the setpoint range limits |
| Local Setpoint Select | 173 | 11 | 000 = Local Set Point #1 only 001 = 2nd Local Setpoint via keyboard or communications* |

*I.D. Code 131—second input function must be set to 0 (LSP).

Associated parameters

Refer to Table 5-6 for the codes required to display or change any of the parameters associated with setpoints.

Table 5-6 Setpoint Associated Parameters

| Parameter | Code |
|-----------------------|----------|
| Setpoint Limits | 007, 008 |
| Computer Setpoint | 125 |
| Setpoint Program/Ramp | 178 |

5.6 Using a Computer Setpoint (Overriding Controller Setpoint) - UDC 3000

Overview You can use a setpoint generated from the computer to override the setpoint being used by the controller.

The value generated by the computer will have ratio and bias applied by the controller.

I.D. codes Use the identifying code in Table 5-7 to enter the computer setpoint.

Shed The computer setpoint override will continue until "SHED" from communications occurs or the controller is placed into monitor mode through communications. Doing periodic "SLAVE READS" within the shed time will allow the override to continue until communication is stopped and shed time elapses.

ATTENTION 0 Shed (code 154) allows the Override to continue indefinitely or until the Override is canceled. (See Override selection I.D. Code 183.)

Override display When SP is overridden, the left most digit in the upper display becomes a "C."

Table 5-7 Computer Setpoint Selection

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| Computer Setpoint | 125 | 18 | Within the Setpoint Range Limits in Engineering Units or Percent. |

Associated parameters Refer to Table 5-8 for the codes required to display or change any of the parameters associated with the computer setpoint.

Table 5-8 Computer Setpoint Associated Parameters

| Parameter | Code |
|--------------------------|----------|
| Setpoint Limits | 007, 008 |
| Local Setpoint #1 | 039 |
| Local Setpoint #2 | 053 |
| Local Setpoint Selection | 173 |

5.7 Overriding Input 1 - UDC 3000

Overview You can override the Input 1 value in the controller using I.D. Code 124 as shown in Table 5-9.

Override display When you override the PV, the first digit in the upper display becomes a “C.”

Table 5-9 Input 1 Override Code

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| Override Input 1 | 124 | 18 | Within the input 1 limits in Engineering Units or Percent (whichever is selected at I.D. Code 161). |

Shed The Override to Input 1 will continue until “SHED” from communications occurs or the controller is placed into monitor via communications. Doing Reads within the shed time will allow the override to continue until Reads are stopped and shed time elapses (I.D. Code 154).

ATTENTION 0 Shed allows override to continue indefinitely or until override is canceled. (See Override Selection, I.D. Code 183.)

Associated parameters Refer to Table 5-10 for the codes required to display or change any of the parameters associated with Input 1.

Table 5-10 Input Override Associated Parameters

| Parameter | Code |
|--|---------|
| High/Low Range Values (Read Only) | 029,030 |
| Temperature Units (Read Only) | 129 |
| Input 1 Type (Read Only) | 168 |
| Transmitter Characterization (Read Only) | 169 |
| Input 1 Bias | 107 |
| Input 1 Filter Time Contrast | 042 |
| Burnout | 164 |
| Emissivity | 023 |

5.8 Canceling the Override - UDC 3000

Overview Doing a Read of I.D. Code 183 will tell you which Override is active—Input 1 (PV) or Setpoint.

Doing a Write lets you cancel either the Input 1 override set at Code 124 or setpoint override set at Code 125 or both.

I.D. codes Using the identifying code in Table 5-11 to Read or Write your selection.

Table 5-11 PV or Setpoint Override Cancellation

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Override Selection | 183 | 11 | 001 = Cancels Input 1 (PV) Override 008 = Cancels Setpoint Override 009 = Cancels Both Overrides |

The example below cancels both Input 1 and setpoint overrides:

XX,0204,65,11,183,009,0 CR LF

5.9 Reading or Changing the Output - UDC 3000

Overview You can read the output of a particular UDC 3000 controller (Read Transaction) or you can change it to suit your needs. (Do a Write Transaction.)

I.D. codes Use the identifying code in Table 5-12 to monitor (Read) or change (Write) the output (in manual only).

ATTENTION To Write (change) the output, the controller must first be in manual mode.

Table 5-12 Reading or Changing the Output

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Output | 123 | 18 | -5 to +105% of full span (current output) 0 to 100% (relay type output) |

Associated parameters Refer to Table 5-13 for the codes required to display or change any of the parameters associated with the output.

Table 5-13 Associated Output Codes

| Parameter | Code |
|-------------------------|--------|
| Output Direction | 135 |
| Output Limits | 14, 15 |
| Output Dropoff Limits | 20 |
| Failsafe Output Values | 40 |
| Output Hysteresis | 19 |
| Output Type (Read only) | 160 |

5.10 Local Setpoint/PID Set Selection/Setpoint Ramp Status - UDC 3000

Overview

Identifying Code 250 lets you monitor or make selections for:

- Tuning Parameter Set #1 or #2
If Tuning Sets selection is “two keyboard” code 171 = 001
- Local Setpoint #1 or #2
If ”2 Local Setpoints” is selected 131 = 0, 173 = 1
- Run or Hold Setpoint Ramp or a Setpoint Program Data
If SP Ramp or SP Program is enabled 178 = 1 Program, 178 = 2 Ramp

Read

Table 5-14 is a table of numbers that could be returned by the UDC 3000 controller. When a Read is requested for this I.D. Code (250) you can determine which parameters are active from this table.

Write

To Write information to the controller, select what parameters you want from Table 5-14 and enter the associated number in the data field of the Write request.

For example:

- Maintain TUNING SET #2
- Maintain LOCAL SET POINT #1
- CHANGE A SET POINT PROGRAM TO RUN

READ 250 response is 020 or 022

WRITE 250 (023), Response Busy

READ 250 Response is 023

Note: some of the numbers are Read only.

Table 5-14 LSP/PID Set Selection and Setpoint Ramp Status

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--------------------|
| Enhanced Function | 250 | 11 | See Figure 5-2 |

5.10 Local Setpoint/PID Set Selection /Setpoint Ramp Status - UDC 3000, Continued

Write, continued

Figure 5-2 I.D. Code 250 Indications

| Tuning Set #2 Selection Local Set Point #2 Selection | | | | |
|---|-----|-----|-----|-----|
| Tuning Set #2 Selection Local Set Point #1 Selection | | | | |
| Tuning Set #1 Selection Local Set Point #2 Selection | | | | |
| Tuning Set #1 Selection Local Set Point #1 Selection | | | | |
| Set Point Ramp or Program Data Selections | | | | |
| None or SP Ramp, Enabled Not in Progress, (READ) | 000 | 008 | 016 | 024 |
| SP Ramp in Progress, Hold (READ/WRITE) | 002 | 010 | 018 | 026 |
| SP Ramp in Progress, Run (READ/WRITE) | 003 | 011 | 019 | 027 |
| SP Program, Enabled Not in Progress, (READ) | 004 | 012 | 020 | 028 |
| SP Program in Progress, Hold (READ/WRITE) | 006 | 014 | 022 | 030 |
| SP Program in Progress, Run (READ/WRITE) | 007 | 015 | 023 | 031 |

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5.11 Configuration Parameters - UDC 3000

Overview

Listed on the following pages are the identifying codes for the parameters in the various setup groups in the UDC 3000 controller. The table below lists the setup groups and the table number in which they are listed. Most of the parameters are configurable through the Host. Some are READ ONLY and are indicated as such and cannot be changed.

| Setup Group | Table Number |
|----------------|--------------|
| TUNING | 5-15 |
| SP RAMP/PROG | 5-16 |
| ADAPTIVE | 5-17 |
| ALGORITHMS | 5-18 |
| INPUT 1 | 5-19 |
| INPUT 2 | 5-20 |
| CONTROL | 5-21 |
| OPTIONS | 5-22 |
| COMMUNICATIONS | 5-23 |
| ALARMS | 5-24 |

Reading or Writing

Do a Read or Write (see “Read/Write Operations”) depending on your requirements using the identifying code and format code listed in the tables. The range or selection available for each range is listed in the tables.

5.11 Configuration Parameters - UDC 3000, Continued

Tuning

Table 5-15 lists all the I.D. Codes and ranges or selection for the function parameters in the setup group “TUNING.”

Table 5-15 Setup Group-Tuning

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Heat Gain or PB | 001 | 18 | PB=0.1 to 9999% Gain=0.1 to 9999 |
| Heat Rate | 002 | 18 | 0.08 to 10.00 Minutes |
| Heat Reset or RPM | 003 | 18 | Reset=0.00 to 50.0 min/rpt RPM = 0.00 to 50.0 rpt/min |
| Manual Reset | 013 | 18 | -100 to +100% Output |
| Cool Gain/Gain #2 or PB | 004 | 18 | PB=0.1 to 9999% Gain=0.1 to 9999 |
| Cool Rate/Rate #2 | 005 | 18 | 0.08 to 10.00 Minutes |
| Cool Rate/Reset #2 or RPM | 006 | 18 | Reset=0.00 to 50.0 min/rpt RPM = 0.00 to 50.0 rpt/min |
| Heat Cycle Time | 158 | 11 | 1 to 120 Seconds |
| Cool Cycle Time | 159 | 11 | 1 to 120 Seconds |
| Lockout Changes to data always possible via communication regardless of this configuration. | 132 | 11 | 0 = None 1 = Calibration 2 = +Configuration 3 = +View (<i>N/A for Limit</i>) 4 = Maximum |

5.11 Configuration Parameters - UDC 3000, Continued

Tuning, continued

Table 5-15 Setup Group-Tuning, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| Keyboard Lockout | 191 | 11 | 0 = All keys enabled 1 = Manual Auto Key Locked 2 = Setpoint Select Key Locked 3 = Manual/Auto and Setpoint Select Keys Locked 4 = Run Hold Key Locked 5 = Run Hold Key and Manual/Auto Keys Locked 6 = Run Hold Key and Setpoint Select Keys Locked 7 = Run Hold, Setpoint Select, and Manual/Auto Keys Locked. |

5.11 Configuration Parameters - UDC 3000, Continued

Setpoint Ramp/Rate/Program

Table 5-16 lists all the I.D. Codes and ranges or selections for the function parameters in the setup group “SP RAMP/RATE/PROGRAM.”

Table 5-16 Setup Group-SP Ramp, Rate, or SP Program

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------------|------------------|-------------|---|
| Setpoint Program Ramp Selection | 178 | 11 | 0 = SP Program, Rate, and Ramp Disabled 1 = SP Program Enabled 2 = SP Ramp Enabled 3 = SP Rate Enabled |
| SP Ramp | | | |
| Single SP Ramp Time | 174 | 11 | 0 to 255 (Minutes) |
| Final Ramp SP Value | 026 | 18 | PV Range in Engineering Units |
| SP Rate | | | |
| Rate Up | 108 | 18 | 0 to 9999 |
| Rate Down | 109 | 18 | 0 to 9999 |
| SP Program | | | |
| Start Segment Number | 175 | 11 | 1 to 11 |
| End Segment Number (Soak) | 176 | 11 | 2, 4, 6, 8, 10, or 12 |
| Program Recycles | 177 | 11 | 0 to 99 |
| Guaranteed Soak Deviation | 087 | 18 | 0 to 99.9 (0 = no soak) |
| Segment #1 Ramp Time | 057 | 18 | 99.59 (0-99 Hrs : 0-59 Min) or 999 (0-999 Deg/Min) |
| Segment #2 Soak Setpoint Value | 058 | 18 | Within Setpoint Limits |
| Segment #2 Soak Time | 059 | 18 | 99.59 (0-99 Hrs : 0-59 Min) |
| Segment #3 Ramp Time | 060 | 18 | 99.59 (0-99 Hrs : 0-59 Min) or 999 (0-999 Deg/Min) |

5.11 Configuration Parameters - UDC 3000, Continued

Setpoint
Ramp/Rate/Program,
continued

Table 5-16 Setup Group-SP Ramp, Rate, or SP Program, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|----------------------------------|------------------|-------------|--|
| Segment #4 Soak Setpoint Value | 061 | 18 | Within Setpoint Limits |
| Segment #4 Soak Time | 062 | 18 | 99.59 (0-99 Hrs : 0-59 Min) |
| Segment #5 Ramp Time | 063 | 18 | 99.59 (0-99 Hrs : 0-59 Min) or 999 (0-999 Deg/Min) |
| Segment #6 Soak Setpoint Value | 064 | 18 | Within Setpoint Limits |
| Segment #6 Soak Time | 065 | 18 | 99.59 (0-99 Hrs : 0-59 Min) |
| Segment #7 Ramp Time | 066 | 18 | 99.59 (0-99 Hrs : 0-59 Min) or 999 (0-999 Deg/Min) |
| Segment #8 Soak Setpoint Value | 067 | 18 | Within Setpoint Limits |
| Segment #8 Soak Time | 068 | 18 | 99.59 (0-99 Hrs : 0-59 Min) |
| Segment #9 Ramp Time | 069 | 18 | 99.59 (0-99 Hrs : 0-59 Min) or 999 (0-999 Deg/Min) |
| Segment #10 Soak Setpoint Value | 070 | 18 | Within Setpoint Limits |
| Segment #10 Soak Time | 071 | 18 | 99.59 (0-99 Hrs : 0-59 Min) |
| Segment #11 Ramp Time | 072 | 18 | 99.59 (0-99 Hrs : 0-59 Min) or 999 (0-999 Deg/Min) |
| Segment #12 Soak Setpoint Value | 073 | 18 | Within Setpoint Limits |
| Segment #12 Soak Time | 074 | 18 | 99.59 (0-99 Hrs : 0-59 Min) |
| Program End State | 181 | 11 | 0 = Disable SP Program 1 = Hold at Program End |
| Controller Status at Program End | 180 | 11 | 0 = Last Setpoint 1 = Manual, Failsafe |

5.11 Configuration Parameters - UDC 3000, Continued

Setpoint
Ramp/Rate/Program,
continued

Table 5-16 Setup Group-SP Ramp, Rate, or SP Program, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------------|------------------|-------------|--|
| Engineering Units or Ramp Segments | 182 | 11 | 0 = HRS:MIN 1 = Degrees/Minute |
| Present Segment Number | 251 | 11 | (READ ONLY) |
| Time Remaining — Minutes | 252 | 11 | (READ ONLY) |
| Time Remaining — Hours | 253 | 11 | (READ ONLY) |
| Cycles Remaining | 254 | 11 | (READ ONLY) Recycles—Elapsed Cycles |

5.11 Configuration Parameters - UDC 3000, Continued

Adaptive tune

Table 5-17 lists all the I.D. Codes and ranges or selections for the function parameters in the setup group “ADAPTIVE TUNE.”

Table 5-17 Setup Group-Adaptive Tune

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|---|
| Adaptive Tune Selection | 152 | 11 | Read only 0 = Disabled 3 = SP Tune 4 = Fast SP Tune |
| Setpoint Change | 153 | 11 | Read Only 5 to 15 |
| Process Gain (KPG) | 114 | 18 | 0.01 to 50.0 |
| Adaptive Tune Error Codes | 151 | 11 | Read Only 0 = None 1 + Output > or < Output Limits or Manual Step = 0 2 = Output > or < Heat/Cool Limits 4 PV Changes Insufficient 5 = Process Identification failed 6 = Calculated Reset Outside Reset Limits 7 = Calculated Gain Outside Gain Limits 8 = Adaptive Tune Aborted on Command 9 = Input #1 Error Detected 10 = Adaptive Tune Illegal during Ramp/SP Program 11 = Adaptive Tune Aborted when External Switch Detected 12 = Adaptive Tune Running |

5.11 Configuration Parameters - UDC 3000, Continued

Algorithm

Table 5-18 lists all the I.D. codes and ranges or selections for the function parameters in the setup group “ALGORITHM.”

Table 5-18 Setup Group-Algorithm

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Algorithm Selection | 128 | 11 | 0 = ON/OFF 1 = PID-A 2 = PID-B 3 = PD-A with Manual Reset 4 = Three Position Step |
| Output Type | 160 | 11 | READ ONLY 0 = Not Allowed 1 = Position Proportional 2 = Relay Simplex 3 = Relay Duplex 4 = Current 5 = Current Duplex - Full Range* 6 = Relay/Current Duplex (relay on heat) 7 = Relay/Current duplex (relay on cool) *Current Duplex with split range not available with communications installed. |

5.11 Configuration Parameters - UDC 3000, Continued

Input 1

Table 5-19 lists all the I.D. Codes and ranges or selections for the function parameters in the setup group "INPUT 1."

Table 5-19 Setup Group-Input 1

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------|------------------|-------------|--|
| Decimal Point Location | 155 | 11 | 0 = XXXX Fixed 1 = XXX.X Floating DP with none 2 = XX.XX Fixed |
| Temperature Units | 129 | 11 | 0 = °F 1 = °C 2 = No Units |
| Input Type 1 | 168 | 11 | READ ONLY 0 = B T/C 1 = E T/C H 2 = E T/C L 3 = J T/C H 4 = J T/C L 5 = K T/C H 6 = K T/C L 7 = N T/C H 8 = N T/C L 9 = R T/C 10 = S T/C 11 = T T/C H 12 = T T/C L 13 = W T/C H 14 = W T/C L 15 = 100 PLAT. 16 = 500 PLAT 17 = 100-LO 18 = 4-20 mA* 19 = 0-10 mV* 20 = 10-50 mA* 21 = 1-5 Volts* 22 = 0-10 Volts* 23 = NIC T/C 24 = Radiamatic (RH) * Limit Control: Non FM Only |

5.11 Configuration Parameters - UDC 3000, Continued

Input 1, continued

Table 5-19 Setup Group-Input 1, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|----------------------------------|------------------|-------------|--|
| Transmitter Characterization | 169 | 11 | READ ONLY 0 = B T/C 1 = E T/C H 2 = E T/C L 3 = J T/C H 4 = J T/C L 5 = K T/C H 6 = K T/C L 7 = N T/C H 8 = N T/C L 9 = R T/C 10 = S T/C 11 = T T/C H 12 = T T/C L 13 = W T/C H 14 = W T/C L 15 = 100 PLAT. 16 = 500 PLAT 17 = 100-LO 18 = LINEAR 19 = SQ ROOT 20 = NIC T/C 21 = Radiamatic (RH) |
| High Range Value | 029 | 18 | READ ONLY - For TC/RTD Types (In Engineering Units, T/C-RTD) |
| Low Range Value | 030 | 18 | READ ONLY-For TC/RTD Types (In Engineering Units, T/C-RTD) |
| Bias | 107 | 18 | -999.9 to 9999 |
| Filter Time Constant | 042 | 18 | 0 to 120 Seconds (No Filter = 0) |
| Burnout (Open Circuit Detection) | 164 | 11 | 0 = None and Failsafe 1 = Upscale 2 = Downscale Limit: 0=Downscale 1=Upscale <i>Writes Illegal</i> |
| Power Line Frequency | 166 | 11 | 0 = 60 Hz 1 = 50 Hz |
| Emissivity | 023 | 18 | 0.01 to 1.00 |

5.11 Configuration Parameters - UDC 3000, Continued

Input 2

Table 5-20 lists all the I.D. Codes and ranges or selections for the function parameters in the setup group "INPUT 2."

Table 5-20 Setup Group-Input 2

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------|------------------|-------------|--|
| Input Type | 170 | 11 | READ ONLY (18 = LINEAR) |
| Transmitter Characterization | 171 | 11 | READ ONLY 0 = B T/C 1 = E T/C H 2 = E T/C L 3 = J T/C H 4 = J T/C L 5 = K T/C H 6 = K T/C L 7 = N T/C H 8 = N T/C L 9 = R T/C 10 = S T/C 11 = T T/C H 12 = T T/C L 13 = W T/C H 14 = W T/C L 15 = 100 PLAT. 16 = 500 PLAT 17 = 100-LO 18 = LINEAR 19 = SQ ROOT 20 = NIC T/C 21 = Radiamatic (RH) |
| High Range Value | 035 | 18 | READ ONLY (In Engineering Units) |
| Low Range Value | 036 | 18 | READ ONLY (In Engineering Units) |
| Filter Time Constant | 043 | 18 | 0 to 120 Seconds (No Filter = 0) |

5.11 Configuration Parameters - UDC 3000, Continued

Control

Table 5-21 lists all the I.D. Codes and ranges or selections for the function parameters in the setup group “CONTROL.”

Table 5-21 Setup Group-Control

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------|------------------|-------------|---|
| Number of Tuning Sets | 172 | 11 | 0 = One Set Only 1 = Two Sets (keyboard or communications) 2 = Two Sets (Auto Switch PV) 3 = Two Sets (Auto Switch PV) |
| PV Switchover Value | 056 | 18 | Within the PV Range |
| Remote Setpoint Source | 131 | 11 | 0 = None 1 = Input 2 |
| Local Setpoint Select | 173 | 11 | 000 = Local Setpoint #1 Only 001 = 2nd Local Setpoint via keyboard or communications* |
| Ratio | 021 | 18 | -20.00 to +20.00 |
| Bias | 022 | 18 | -999 to +9999 in Engineering Units |
| LSP Tracking | 138 | 11 | 0 = None 1 = Rsp 2 = PV |
| Power Up Recall | 130 | 11 | 0 = Manual—LSP 1 = Automatic—LSP 2 = Automatic—RSP 3 = Last Mode, Last Setpoint 4 = Last Mode, Last Local Setpoint |
| High Setpoint Limit | 007 | 18 | Within the PV Range (Engineering Units) |
| Low Setpoint Limit | 008 | 18 | Within the PV Range (Engineering Units) |

5.11 Configuration Parameters - UDC 3000, Continued

Control, continued

Table 5-21 Setup Group-Control, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------|------------------|-------------|--|
| Control Output Direction | 135 | 11 | 0 = Direct 1 = Direct 2 = Reverse 3 = Reverse |
| Output Change Rate Limiting | 189 | 11 | 0 = Disable 1 = Enable |
| Output Change Rate Up | 110 | 18 | 1 to 9999 %/MIN |
| Output Change Rate Down | 111 | 18 | 1 to 9999 %/MIN |
| High Output Limit | 014 | 18 | -5 to +105% of output |
| Low Output Limit | 015 | 18 | -5 to +105% of output |
| Output Dropoff Limit | 020 | 18 | -5 to +105% of output |
| Deadband | 018 | 18 | -5 to +25.0% |
| Output Hysteresis | 019 | 18 | 0 to 5.0% of PV span |
| Failsafe Output Value | 040 | 18 | Within the Range of Output Limits |
| Proportional Band Units | 148 | 11 | 0 = Gain 1 = Proportional Band |
| Reset Units | 149 | 11 | 0 = Minutes 1 = Repeats per Minute |

*I.D. Code 131—Second Input Function must be set to 0 (LSP).

5.11 Configuration Parameters - UDC 3000, Continued

Options

Table 5-22 lists all the I.D. Codes and ranges or selections for the function parameters in the setup group “OPTIONS.”

Table 5-22 Setup Group-Options

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Digital Input #1 | 186 | 11 | 0 = None 1 = To Manual 2 = To Local Setpoint #1 3 = To Local Setpoint #2 4 = To Direct Action 5 = To Hold 6 = To PID 2 7 = PV = Input 2 8 = To Run 9 = Reset SP Program 10 = Inhibit PID Integral (I) Action 11 = To Manual Failsafe 12 = Disable Keyboard 13 = To Automatic 14 = To Timer 15 = To Auto/Manual Station <i>For Digital Input combinations, see Figure 5-3</i> |
| Digital Input #2 | 187 | 11 | Same as Digital Input #1 (Code 186) |
| Digital Input Status | 188 | 11 | 0 = Digital Input 1 Open Digital Input 2 Open 1 = Digital Input 1 Closed Digital Input 2 Open 2 = Digital Input 1 Open Digital Input 2 Closed 3 = Digital Input 1 Closed Digital Input 2 Closed |

5.11 Configuration Parameters - UDC 3000, Continued

COMRS422

Table 5-23 lists all the I.D. Codes and ranges or selections for the function parameters in the setup group “COMRS422.”

Table 5-23 Setup Group-COMRS422

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------------------|------------------|-------------|--|
| Shed Time | 154 | 11 | 0 to 255 Sample Periods 0 = No Shed |
| Shed Controller Mode and Output Level | 162 | 11 | 0 = Last Mode and Last Output 1 = Manual Mode, Last Output 2 = Manual Mode, Failsafe Output 3 = Automatic Mode |
| Shed Setpoint Recall | 163 | 11 | 0 = Use UDC Setpoint as determined by Remote/Local mode, LSP unchanged 1 = Use UDC Setpoint as determined by Remote/Local mode, LPS = Last setpoint prior to shed |
| Communication Units | 161 | 11 | 0 = Percent (%) 1 = Engineering Units |

5.11 Configuration Parameters - UDC 3000, Continued

Alarms

Table 5-24 lists all the I.D. Codes and ranges or selections for the function parameter in the setup group “ALARMS.”

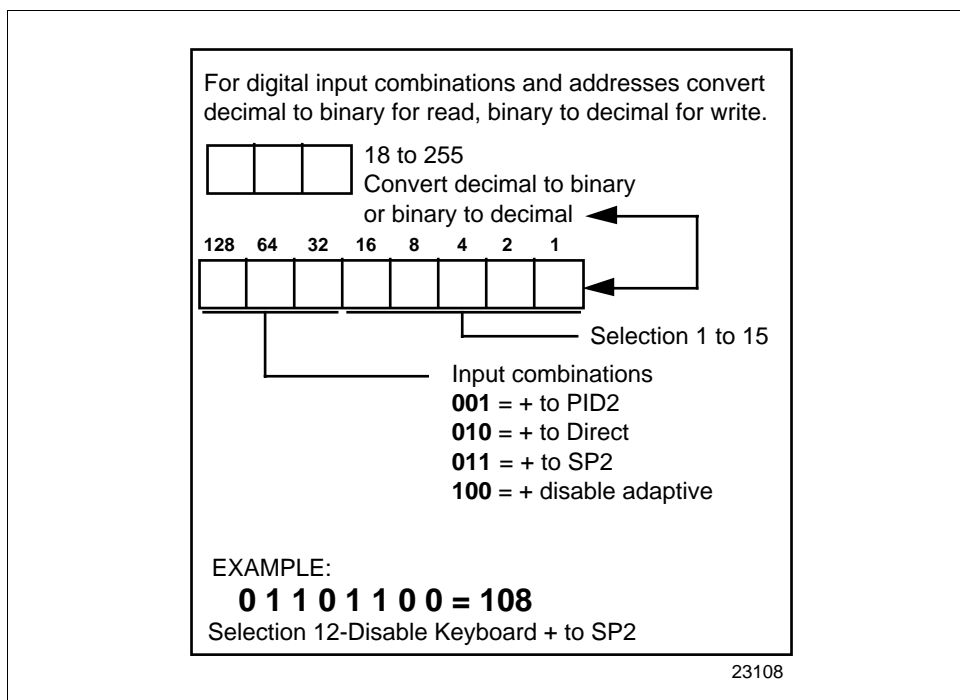
Table 5-24 Setup Group-Alarms

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Alarm #1 SP #1 Value | 009 | 18 | Value in Engineering Units |
| Alarm #1 SP #2 Value | 010 | 18 | Value in Engineering Units |
| Alarm #2 SP #1 Value | 011 | 18 | Value in Engineering Units |
| Alarm #2 SP #2 Value | 012 | 18 | Value in Engineering Units |
| Alarm #1 SP #1 Type | 140 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = PV 4 = Deviation 5 = Output 6 = Alarm on Shed 7 = SP Event ON 8 = SP Event OFF 9 = Alarm on Manual |
| Alarm #1 SP #2 Type | 142 | 11 | Same as Code 140 |
| Alarm #2 SP #1 Type | 144 | 11 | Same as Code 140 |
| Alarm #2 SP #2 Type | 146 | 11 | Same as Code 140 |
| Alarm #1 SP #1 State | 141 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm #1 SP #2 State | 143 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm #2 SP #1 State | 145 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm #2 SP #2 State | 147 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm Hysteresis | 041 | 18 | 0 to 100.0% of full span or full output |

5.11 Configuration Parameters - UDC 3000, Continued

Digital input combinations

Figure 5-3 Digital Input Combinations



Section 6 – Read, Write and Override Parameters on UDC 5000 Ultra-Pro Controllers

6.1 Overview

Introduction

This section contains information concerning reading, writing, and overriding parameters on the UDC 5000 Ultra-Pro Controller. There are two types of parameters:

- Data Transfer—these parameters include reading control data, option status, and reading or changing setpoints or outputs.
- Configuration Data—all the configuration data is list in the order in which it appears in the controller.

Each type of parameter has the identifying codes listed with it. Follow the message exchange rules listed in “Read and Write Operations.”

6.1 Overview - UDC 5000, Continued

What's in this section This section contains the following topics:

| | See Page |
|--|----------|
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| 6.2 Reading Control Data | 88 |
| 6.3 Option Status | 89 |
| 6.4 Miscellaneous Read Only's | 90 |
| 6.5 Setpoints | 92 |
| 6.6 Using a Computer Setpoint | 93 |
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| Tuning | 102 |
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| Input 1 | 114 |
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| Control | 121 |
| Control 2 | 121 |
| Options | 123 |
| Communications | 124 |
| Alarms | 125 |
| Displays | 127 |

6.1 Overview - UDC 5000, Continued

General information

Analog Parameters

- Whenever Analog Parameters 001 through 114 (those that can be changed via Communications) are changed, a write cycle occurs immediately after receipt of the message.

Override Parameters

- Override Analog Parameters 120, 123 and 125 (PV, output, computer setpoint) are not stored in non-volatile memory and can be changed as frequently as desired with no effect on non-volatile memory retentivity, but controller must remain in slave mode.

Digital Parameters

- Whenever digital configuration parameters 128 through 250 are updated via communications, the non-volatile memory is updated as soon as the message is received.

6.2 Reading Control Data - UDC 5000

Overview

You can Read the following control data from the UDC controller.

- Input 1
- Input 2
- Input 3
- PV
- Internal RV
- PV, Setpoint, Output

I.D. codes

Use the identifying codes listed in Table 6-1 to read the specific items.

A Write request for these Codes will result in an Error message.

Table 6-1 Control Data Parameters

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|------------------------------------|
| Input #1 | 118 | 18 | In Engineering Units or Percentage |
| Input #2 | 119 | 18 | In Engineering Units or Percentage |
| Input #3 | 117 | 18 | In Engineering Units or Percentage |
| PV | 120 | 18 | In Engineering Units or Percentage |
| Internal RV | 121 | 18 | In Engineering Units or Percentage |
| PV, Setpoint, and Output* | 122 | 18 | In Engineering Units or Percentage |

*This Read request will give a three variable response (see Read/Write operation).

6.3 Option Status - UDC 5000

Read

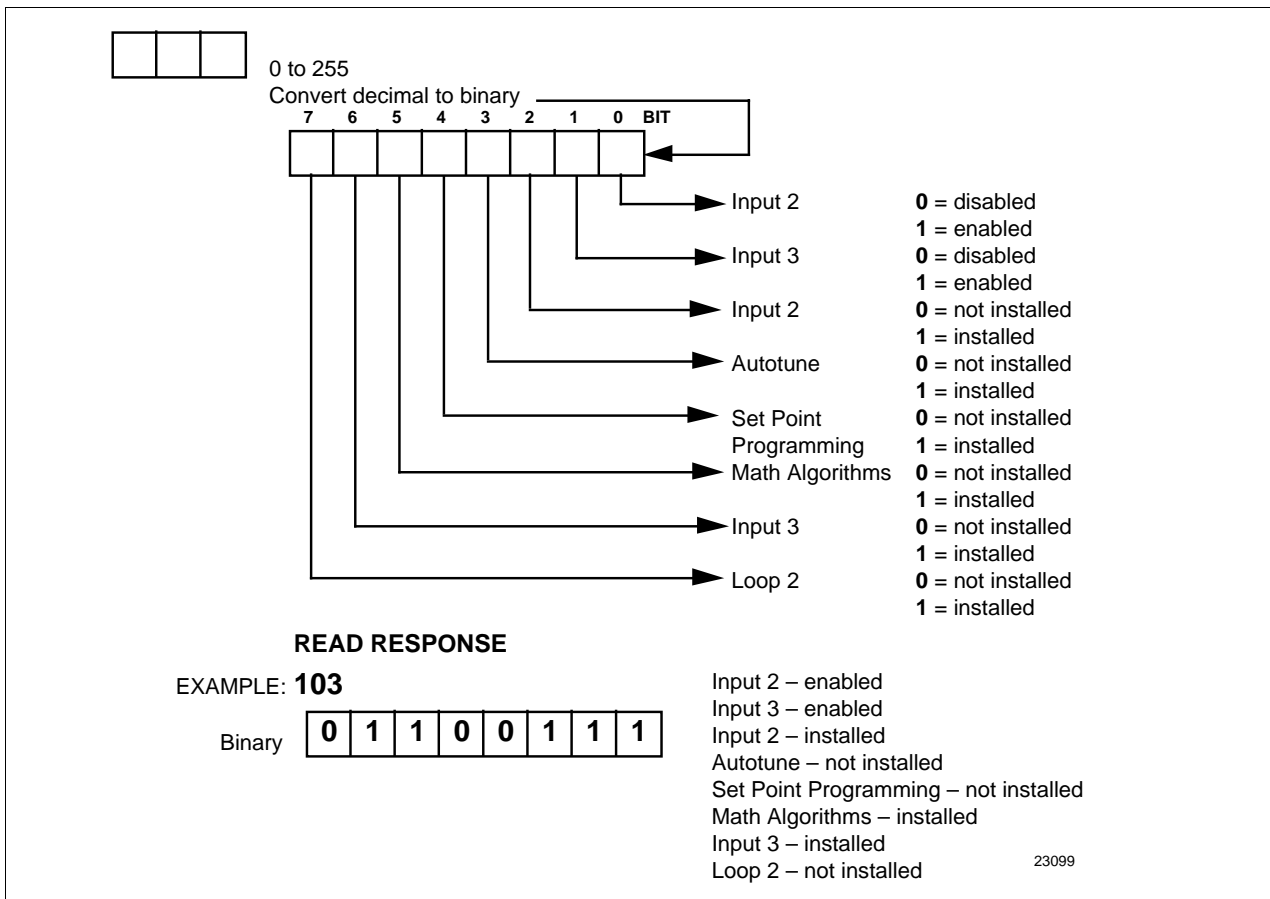
Doing a Read of I.D. Code 185 listed in Table 6-2 will tell you which of the available options are enabled/installed or disabled/not installed.

Table 6-2 Option Status

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|--------------------|
| Option Status (read only) | 185 | 11 | See Figure 6-1 |

The data field in the response message will be a decimal number from 0 to 255. Convert the decimal number to binary as shown in Figure 6-1 to determine which options are or are not active.

Figure 6-1 Option Status Information



Write

A limited Write is available with which you can enable/disable Input 3. Change bit 0 or 1 as shown in Figure 6-1 and write the decimal designation to Code 185.

EXAMPLE: Disable Input 3—Write 101

6.4 Miscellaneous Read Only's - UDC 5000

I.D. codes for read only's

The identifying codes listed in Table 6-3 represent some parameters that are Read only. No Writes allowed.

Table 6-3 Miscellaneous Read Only's

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Software Type | 157 | 11 | Read only (UDC 5000) 61 = Basic software 62 = Field upgrade for Autotune + Input 3 63 = Field upgrade for Autotune + Math + SPP + Input 3 64 = Field upgrade for Autotune + Input 3 + 2 Loop 65 = Field Upgrade has all options |
| Software Version (Read only) | 167 | 11 | 0 to 99 |
| Digital Input Switch Status (Read only) | 190 | 11 | 0 = Switch #1 open Switch #2 open 1 = Switch #1 closed Switch #2 open 2 = Switch #1 open Switch #2 closed 3 = Switch #1 closed Switch #2 closed |
| UDC Error Status (Definitions are listed in Table 6-4) | 255 | 11 | See below Read/Write* 001 = Emergency Manual 002 = Failsafe 004 = Working Calibration Checksum Error 008 = Configuration Checksum Error 016 = Parameter Limit Indicator 032 = Hardware Failure 064 = Restart after Shed 128 = Configuration/Calibration Memory Changed * Write to clear. |

6.4 Miscellaneous Read Only's - UDC 5000, Continued

I.D. codes for read only's, continued

ATTENTION Any checksum error reported can only be cleared via keyboard/display viewing of the Status group (recalculates all checksums at least parameter.)

FOR EXAMPLE: If read returns 192 (restart after shed-064 plus configuration change -128)

Write anything to I.D. Code 255

Read returns 000 (clear)

Error status definitions

Table 6-4 lists the UDC error status codes and their definitions.

Table 6-4 Error Status Definitions

| Status Code | Error | Definitions |
|-------------|---|--|
| 001 | Emergency Manual | Indicates that the output of the unit which has been in slave operation, is under manual control, locally. Error remains until local control is relinquished at the controller. |
| 002 | Failsafe | Error occurs whenever the control reverts to failsafe operation and remains as long as the condition exists. |
| 004 | Working Calibration Checksum Error | Indicates that an error exists in the working calibration data. Re-select the inputs to load factory calibration data or field calibrate the inputs. |
| 008 | Configuration Checksum Error | Error exists in the configuration data. Verify configuration data at the keyboard. Checksum will be recomputed by stepping the controller through the status tests. |
| 016 | Parameter Limit Indicator | A limit condition exists on one of the following: PV, RV, Input 1, Input 2, Input 3, Computer Setpoint. User must determine EXACT limit condition and correct. |
| 032 | Hardware Failure | Indicates either a RAM test failure or Input 1, Input 2, Input 3 failure on two consecutive conversions. |
| 064 | Restart After Shed | Error occurs whenever a shed of slave override is performed. Error is reset following a Write command to I.D. Code 255 (064). |
| 128 | Configuration /Calibration Memory Changed | Error occurs whenever shed, configuration, or calibration changed. Also occurs whenever there is a change of state in 001, 002, 004, 008, or 016. Error is reset following a Write command to I.D. Code 255. |

6.5 Setpoints - UDC 5000

Overview

You can use three separate setpoints in the UDC Controller. The identifying codes listed in Table 6-5 allow you to select which setpoint you want to use and to enter a value in Engineering Units or Percent (whichever is selected at Code 161) for that setpoint via communications.

I.D. codes

Make your selection using I.D. Code 173 and enter the value for the setpoint chosen using I.D. Code 39 (SP1) or 53 (SP2) or 113 (SP3).

Table 6-5 Setpoint Code Selections

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Local Setpoint #1 | 039 | 18 | Value within the setpoint range limits |
| Local Setpoint #2 | 053 | 18 | Value within the setpoint range limits |
| Local Setpoint #3 | 113 | 18 | Value within the setpoint range limits |
| Local Setpoint Select | 173 | 11 | 000 = Local Setpoint #1 only 001 = 2nd Local Setpoint via keyboard or communications 003 = 3rd Local Setpoint via keyboard or communications |

Associated parameters

Refer to Table 6-6 for the codes required to display or change any of the parameters associated with the setpoint.

Table 6-6 Setpoint Associated Parameters

| Parameter | Code |
|-------------------|----------|
| Setpoint Limits | 007, 008 |
| Computer Setpoint | 125 |

6.6 Using a Computer Setpoint (Overriding Controller Setpoint) - UDC 5000

Overview You can use a setpoint generated from the computer to override the setpoint being used by the controller.

The value generated by the computer will have Ratio and Bias applied by the controller.

I.D. codes Use the identifying code in Table 6-7 to enter the computer setpoint.

Table 6-7 Computer Setpoint Selections

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| Computer Setpoint | 125 | 18 | Within the Setpoint Range Limits in Engineering Units or Percent. |

Shed The Computer Setpoint Override will continue until "SHED" from Communications occurs or the controller is placed into monitor mode through communications. Doing periodic "SLAVE READS" within the shed time will allow the override to continue until communication is stopped and Shed Time elapses.

ATTENTION 0 Shed (code 154) allows the Override to continue indefinitely or until the Override is canceled. (See Override selection I.D. Code 183.)

When SP is overridden, the left most digit in the upper display becomes a "C."

6.6 Using a Computer Setpoint (Overriding Controller Setpoint) - UDC 5000, Continued

Associated parameters

Refer to Table 6-8 for the codes required to display or change any of the parameters associated with the computer setpoint.

Table 6-8 Computer Setpoint Associated Parameters

| Parameter | Code |
|--------------------------|----------|
| Setpoint Limits | 007, 008 |
| Local Setpoint #1 | 039 |
| Local Setpoint #2 | 053 |
| Local Setpoint #3 | 113 |
| Local Setpoint Selection | 173 |

6.7 Overriding the Inputs - UDC 5000

Overview

You can override any of the three input values in the controller using the codes listed in Table 6-9.

Table 6-9 Input Override Codes

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| Override Input 1 | 124 | 18 | Within the input limits in engineering units or percent (whichever is selected at I.D. Code 161). |
| Override Input 2 | 115 | 18 | Within the input limits in engineering units or percent (whichever is selected at I.D. Code 161). |
| Override Input 3 | 116 | 18 | Within the input limits in engineering units or percent (whichever is selected at I.D. Code 161). |

Shed

The override to the input will continue until “SHED” from Communications occurs or the controller is placed into monitor via communications. Doing Reads within the shed time will let the override continue until Reads are stopped and SHED time elapses (I.D. Code 154).

ATTENTION 0 shed time (Code 154) lets the override continue indefinitely or until override is canceled. (See I.D. Code 183.)

6.7 Overriding the Inputs - UDC 5000, Continued

Associated parameters

Refer to Table 6-10 for the codes required to display or change any of the parameters associated with the inputs.

Table 6-10 Input Override Associated Parameters

| Parameter | Code |
|------------------------------|---------|
| High/Low Range Values | |
| Input 1 | 029/030 |
| Input 2 | 035/036 |
| Input 3 | 108/109 |
| Temperature Units | 129 |
| Input Type | |
| Input 1 | 168 |
| Input 2 | 170 |
| Input 3 | 186 |
| Transmitter Characterization | |
| Input 1 | 169 |
| Input 2 | 171 |
| Input 3 | 187 |
| Bias | |
| Input 1 | 107 |
| Input 2 | 137 |
| Input 3 | 111 |
| Filter Time Constant | |
| Input 1 | 042 |
| Input 2 | 043 |
| Input 3 | 112 |
| Burnout | |
| Input 1 | 164 |
| Input 2 | 165 |

6.8 PV, Setpoint, or Input Override Status or Cancellation - UDC 5000

Overview You can Read the present override status of the inputs, PV, or setpoint or you can do a Write transaction to cancel an existing override.

I.D. codes Use the Identifying Code in Table 6-11 to Read or Write your selection.

Table 6-11 PV, Setpoint , or Input Override Cancellation

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------------|------------------|-------------|--|
| PV or Setpoint Override Selection | 183 | 11 | 01 = Input 1 02 = Input 2 04 = PV 08 = Setpoint 16 = Input 3 |

6.9 Reading or Changing the Output - UDC 5000

Overview You can read the output of a particular UDC controller (Read transaction) or you can change it to suit your needs. (Do a Write transaction.)

I.D. codes Use the identifying code in Table 6-12 to monitor (Read) or change (Write) the output (in manual only).

ATTENTION To Write (change) the output, the controller must first be in manual mode.

Table 6-12 Reading or Changing the Output

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Output | 123 | 18 | -5 to +105% of full span (current output) 0 to 100% (relay type output) |

Associated parameters Refer to Table 6-13 for the codes required to display or change any of the parameters associated with the output.

Table 6-13 Associated Output Codes

| Parameter | Code |
|------------------------|----------|
| Output Limits | 014, 015 |
| Output Dropoff Limits | 020 |
| Failsafe Output Values | 040 |
| Output Deadband | 018 |
| Output Hysteresis | 019 |
| Output Type | 160 |

6.10 Local Setpoint/PID Selection/Setpoint Ramp Status - UDC 5000

Overview

Identifying Code 250 lets you

- Monitor your Setpoint Ramp Status
 - In Progress, Not in Progress
 - In Run, On Hold (see Note 1)and determine which tuning set and local setpoint is being used.
- Abort, Run, Hold, or Start and SP Ramp.
- Select Local Setpoint #1, #2, or #3.
- Select Tuning Parameter Set #1 or #2.

Read

When you do a Read, the code in Table 6-14 determines which parameters are active:

- Local Setpoint Selection
- Tuning Parameter Set Selection
- Setpoint Ramp Status

Table 6-14 I.D. Code 250 Reads

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--------------------|
| Read Local Set Point/PID Set Selection and SP Ramp Status | 250 | 11 | See Figure 6-2 |

6.10 Local Setpoint/PID Selection /Setpoint Ramp Status - UDC 5000, Continued

Read, continued

Figure 6-2 I.D. Code 250 Indications

| | | | | | | |
|--|-----|-----|-----|-----|-----|-----|
| Tuning Set #2 Selection | | | | | | |
| Local Set Point #3 Selection | | | | | | |
| Tuning Set #1 Selection | | | | | | |
| Local Set Point #3 Selection | | | | | | |
| Tuning Set #2 Selection | | | | | | |
| Local Set Point #2 Selection | | | | | | |
| Tuning Set #2 Selection | | | | | | |
| Local Set Point #1 Selection | | | | | | |
| Tuning Set #1 Selection | | | | | | |
| Local Set Point #2 Selection | | | | | | |
| Tuning Set #1 Selection | | | | | | |
| Local Set Point #1 Selection | | | | | | |
| SET POINT RAMP INFORMATION | | | | | | |
| SP Ramp, Enabled not in progress (Read only) | 000 | 008 | 016 | 024 | 032 | 048 |
| SP Ramp in progress, Hold (Read/Write) | 002 | 010 | 018 | 026 | 034 | 050 |
| SP Ramp in progress, Run (Read/Write) | 003 | 011 | 019 | 027 | 035 | 051 |
| SP Program, Enabled no in progress (Read only) | 004 | 012 | 020 | 028 | 036 | 052 |
| SP Program in progress, Hold (Read/Write) | 006 | 014 | 022 | 030 | 038 | 054 |
| SP Program in Progress, Run (Read/Write) | 007 | 015 | 023 | 031 | 039 | 055 |

23100

Write

A Write of code 250 lets you change the SP ramp status as well as the local setpoint or tuning set selection. Refer to Table 6-15.

Table 6-15 I.D. Code 250 Writes

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| Write | 250 | 11 | 000 = Abort SP Ramp 001 = Run SP Ramp 002 = Hold SP Ramp 003 = Start SP Ramp 004 = Change to Local Setpoint #1 005 = Change to Local Setpoint #2 006 = Change to PID Tuning Set #1 007 = Change to PID Tuning Set #2 008 = Change to Local Setpoint #3 |
| Local Setpoint/PID Set Selection and SP Ramp Status | | | |

ATTENTION

To enable or disable the setpoint ramp, refer to identifying Code 150.

6.11 Configuration Parameters - UDC 5000

Overview

Listed on the next pages are the Identifying codes for the parameters in the various Setup groups in the UDC 5000 Ultra-Pro controller. The table below lists the Setup Groups and their table numbers in which they are listed. Most of the parameters are configurable through the host. Some are Read Only and are indicated as such and cannot be changed.

| Setup Group | Table Number |
|------------------------|--------------|
| TUNING | 6-16 |
| TUNING L2 | 6-17 |
| SP RAMP/PROGRAM | 6-18 |
| AUTOTUNE/ADAPTIVE TUNE | 6-20 |
| ALGORITHM | 6-21 |
| OUTPUT ALGORITHM | 6-22 |
| INPUT 1 | 6-23 |
| INPUT 2 | 6-24 |
| INPUT 3 | 6-25 |
| CONTROL AND CONTROL 2 | 6-26 |
| OPTIONS | 6-27 |
| COMMUNICATIONS | 6-28 |
| ALARMS | 6-29 |
| DISPLAY | 6-30 |

Reading or writing

Do a Read or Write (see “Read/Write Operations”), depending on your requirements using the identifying code and format code listed in the tables. The range or selection available for each range is listed in the tables.

6.11 Configuration Parameters - UDC 5000, Continued

Tuning

Table 6-16 lists all the I.D. codes and ranges or selections for the function parameters in the Setup Group “TUNING” (Loop 1).

Table 6-16 Setup Group-Tuning (Loop 1)*

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Gain #1 or PB | 001 | 18 | 0.1 to 1000 |
| Rate #1 | 002 | 18 | 0.00 to 10.00 |
| Reset #1 | 003 | 18 | 0.02 to 50.00 |
| Manual Reset | 013 | 18 | -100 to +100 |
| Gain #2 or PB | 004 | 18 | 0.1 to 1000 |
| Rate #2 | 005 | 18 | 0.00 to 10.00 |
| Reset #2 | 006 | 18 | 0.02 to 50.00 |
| Cycle Time #1 | 158 | 11 | 1 to 120 seconds |
| Cycle Time #2 | 159 | 11 | 1 to 120 seconds |
| Lockout (keyboard only) Changes to data always possible via communications regardless of this configuration. | 132 | 11 | 0 = None 1 = Calibration + Configuration 2 = Max Lockout 3 = Calibration only 4 = Calibration + Configuration + View |

* Loop selected by address in request message.

6.11 Configuration Parameters - UDC 5000, Continued

Tuning 2

Table 6-17 lists all the I.D. codes and ranges or selections for the function parameters in the Setup Group “TUNING 2” (Loop 2).

Table 6-17 Setup Group-Tuning 2* (Loop 2)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--------------------|
| Gain #3 or PB | 001 | 18 | 0.1 to 1000 |
| Rate #3 | 002 | 18 | 0.00 to 10.00 |
| Reset #3 | 003 | 18 | 0.02 to 50.00 |
| Man 3 Reset | 013 | 18 | –100 to +100 |
| Gain #4 or PB | 004 | 18 | 0.1 to 1000 |
| Rate #4 | 005 | 18 | 0.00 to 10.00 |
| Reset #4 | 006 | 18 | 0.02 to 50.00 |
| Cycle Time #3 | 158 | 11 | 1 to 120 seconds |
| Cycle Time #4 | 159 | 11 | 1 to 120 seconds |

* Loop selected by address in request message.

6.11 Configuration Parameters - UDC 5000, Continued

SP ramp/program

Table 6-18 lists all the I.D. codes and ranges or selections for the function parameters in setup group “SP RAMP.”

Table 6-18 Setup Group-Setpoint Ramp/Program

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| Setpoint Program/Ramp Selection | 178 | 11 | 0 = SP Program and Ramp disabled 1 = SP Program enabled 2 = SP Ramp enabled 3 = SP Program enabled–Loop 2 4 = SP Program enabled–both loops 5 = SP Ramp enabled–Loop 2 6 = SP Ramp enabled–both loops |
| SP RAMP Setpoint Ramp Loop Enable | 150 | 11 | 0 = OFF 2 = SP Ramp – enabled Loop 1 3 = SP Ramp – enabled Loop 2 4 = SP Ramp – enabled both loops |
| Single SP Ramp Time | 174 | 11 | 0 to 255 (minutes) applies to whichever loop has SP Ramp configured |
| Final Ramp SP Value | 026 | 18 | PV Range in Engineering Units |
| SP PROGRAM Start Segment No.* | 175 | 11 | 1 to 19 |
| End Segment No. (Soak)* | 176 | 11 | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 |
| No. of Recycles* | 177 | 11 | 0 to 99 |

6.11 Configuration Parameters - UDC 5000, Continued

SP ramp/program,
continued

Table 6-18 Setup Group-Setpoint Ramp/Program, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| Program Status at Power Up from Power Outage* | 179 | 11 | 0 = Abort program on reset 1 = Resume program at last segment and last segment time 2 = Restart |
| Controller Status at Program End* | 180 | 11 | 0 = Hold at last setpoint in program 1 = Manual mode/ failsafe output |
| Controller State at Program End* | 181 | 11 | 0 = Disables SP program 1 = Hold–Run key restarts SP program |
| Engineering Units for Ramp Segments* | 182 | 11 | 0 = HRS:MIN 1 = Degrees/minute |
| Guaranteed Soak Enable* | 184 | 11 | 0 = Enable 1 = Disable |
| Present Segment No.* | 251 | 11 | (Read only) 1 to 20 |
| Time Remaining Minutes* | 252 | 11 | (Read only) 0 to 59 |
| Time Remaining Hours* | 253 | 11 | (Read only) 0 to 99 |
| Cycles Remaining* | 254 | 11 | (Read only) 0 to 99 recycles–elapsed cycles |
| Segment Ramp Time | See Table 6-17 | 18 | 99.59 (0-99 hrs; 0-59 min) 999 (0-999 deg/min) |
| Segment Soak Setpoint Value | See Table 6-17 | 18 | Within setpoint limits |
| Segment Soak Time | See Table 6-17 | 18 | 99.59 (0-99 hrs; 0-59 min) |
| Segment Guaranteed Soak Deviation + (Plus) | See Table 6-17 | 18 | 0 to 99.99 |
| Segment Guaranteed Soak Deviation – (Minus) | See Table 6-17 | 18 | 0 to 99.99 |

*Applies to whichever loop has Setpoint Program applied to it.

6.11 Configuration Parameters - UDC 5000, Continued

Ramp and soak I.D. codes for each segment

Table 6-19 lists each segment and the I.D. code associated with ramp and soak information for each particular segment.

Table 6-19 Setpoint Program Ramp and Soak Identifying Codes for Each Segment

| Segment Number | Identifying Codes | | | | |
|----------------|-------------------|---------------------|-----------|----------------------------------|-----------------------------------|
| | Ramp Time | Soak Setpoint Value | Soak Time | Guaranteed Soak Deviation (Plus) | Guaranteed Soak Deviation (Minus) |
| 1 | 057 | — | — | — | — |
| 2 | — | 058 | 059 | 087 | 088 |
| 3 | 060 | — | — | — | — |
| 4 | — | 061 | 062 | 089 | 090 |
| 5 | 063 | — | — | — | — |
| 6 | — | 064 | 065 | 091 | 092 |
| 7 | 066 | — | — | — | — |
| 8 | — | 067 | 068 | 093 | 094 |
| 9 | 069 | — | — | — | — |
| 10 | — | 070 | 071 | 095 | 096 |
| 11 | 072 | — | — | — | — |
| 12 | — | 073 | 074 | 097 | 098 |
| 13 | 075 | — | — | — | — |
| 14 | — | 076 | 077 | 099 | 100 |
| 15 | 078 | — | — | — | — |
| 16 | — | 079 | 080 | 101 | 102 |
| 17 | 081 | — | — | — | — |
| 18 | — | 082 | 083 | 103 | 104 |
| 19 | 084 | — | — | — | — |
| 20 | — | 085 | 086 | 105 | 106 |

6.11 Configuration Parameters - UDC 5000, Continued

Autotune/adaptive tune

Table 6-20 lists all the I.D. codes and ranges or selections for the function parameters in setup group “AUTOTUNE/ADAPTIVE TUNE.” Loop 1 or 2 is selected in the request message.

Table 6-20 Setup Group-Autotune/Adaptive Tune

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Autotune/ Adaptive Tune Selection | 152 | 11 | 0 = Autotune and adaptive tune disabled – Loop 1 1 = Exponential response – Loop 1** 2 = Critically damped – moderate – Loop 1** 3 = Critically damped – fast – Loop 1 4 = Auto step – Loop 1 5 = Manual step – Loop 2 6 = Auto step – Loop 2 7 = Adaptive SP – Loop 1 8 = Adaptive SP + PV – Loop 1 |
| Adaptive Tune Selection (Loop 2 only) NOTE: Loop 1 I.D. Code 152 must not be configured for any Autotune; i.e. Autotune and Adaptive are mutually exclusive. | 152 | 11 | 0 = Disabled 1 = Adaptive setpoint 2 = Adaptive SP + PV |
| Autotune Step Size/Adaptive SP Change Size (Loop 1 only) | 153 | 11 | Step size/5 to 15% span SP change/–100 to +100 |
| Process Gain (Loop 1 only) | 114 | 18 | 0.01 to 50.0 |

6.11 Configuration Parameters - UDC 5000, Continued

Autotune/adaptive
tune, continued

Table 6-20 Setup Group-Autotune/Adaptive Tune, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------------|------------------|-------------|--|
| Adaptive Tune Error (Read only) | 151 | 11 | 0 = None 1 = Output less than or greater than Output Limits or Man Step = 0 2 = Output greater or less than Heat/Cool Limits 3 = Alarm 1 error 4 = PV change not sufficient 5 = Process Identification failed 6 = Calculated Reset outside Reset Limits 7 = Calculated Gain outside Gain Limits 8 = Adaptive tune/ Autotune aborted on command 9 = Input 1 error detected 10 = Adaptive Tune/ Autotune illegal during Ramp/Program 11 = Adaptive Tune/ Autotune aborted when external switch detected |

**Selections 1 and 2 will internally default to the #3 selection.

6.11 Configuration Parameters - UDC 5000, Continued

Algorithm

Table 6-21 lists all the I.D. codes and ranges or selections the function parameters in setup group “ALGORITHM.” Loop 1 or 2 selected in the request message.

Table 6-21 Setup Group-Algorithm

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Control Algorithm Selection *not available for Loop 2 | 128 | 11 | 0 = ON/OFF* 1 = PID-A 2 = PID-B 3 = PD-A with manual reset 4 = Three position step* |
| Loop 2 Selection (Loop 2 address only) | 168 | 11 | 0 = Loop 1 only 1 = Loop 2 enabled 2 = Loop 1 and 2 are cascaded. Loop 2 primary – Loop 1 secondary. |
| Output Override Hi or Lo Select (on Loop 2 address only – Loop 1 Output in Auto) | 136 | 11 | 0 = Disabled 1 = Hi Select 2 = Lo Select |

6.11 Configuration Parameters - UDC 5000, Continued

Algorithm, continued Table 6-21 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| <p>Second Input Function</p> <p>NOTE: Any selection except 0 may affect the Third Input Function (ID Code #188)</p> <p>All selections available for Loop 1. Selections 0, 1, and 2 only selections available for Loop 2. All others result in error message.</p> | 131 | 11 | <p>0 = Local setpoint</p> <p>1 = Remote setpoint with ratio</p> <p>2 = Remote setpoint with ratio and bias (auto bias)</p> <p>3 = Weighted average (LSP)</p> <p>4 = Relative humidity (LSP)</p> <p>5 = Carbon potential A (LSP)</p> <p>6 = Carbon potential B (LSP)</p> <p>7 = Carbon potential C (LSP)</p> <p>8 = Feed forward (Loop 1)</p> <p>9 = Add inputs 1 and 2 – without ratio and bias</p> <p>10 = Subtract input 2 from input 1 – without ratio and bias</p> <p>11 = Input high select (without ratio and bias)</p> <p>12 = Input low select (without ratio and bias)</p> <p>13 = General math A (sq. rt. mult. div.)</p> <p>14 = General math B (sq. rt. mult.)</p> <p>15 = General math C (mult. div.)</p> <p>16 = General math D (mult.)</p> <p>17 = Summer (with ratio and bias)</p> <p>18 = Input hi select (with ratio and bias)</p> |

6.11 Configuration Parameters - UDC 5000, Continued

Algorithm, continued Table 6-21 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Second Input Function (continued) | 131 | 11 | 19 = Input low select (with ratio and bias) 20 = Feedforward – Loop 2 21 = Carbon potential D 22 = Carbon potential FCC 23 = Oxygen 24 = Dewpoint |
| Atmospheric Pressure | 024 | 18 | 590.0 to 760.0 |
| Percent Co | 046 | 18 | 0.02 to 0.350 |
| Constant K | 045 | 18 | 0 to 20.00 |
| Input 3 Function NOTES: When 2nd input function (ID 131) is 1 or 2, Input 3 function cannot be selection 1 or 2. When 2nd input function (ID 131) is 3 or greater, input 3 function cannot be selection 3 through 7. | 188 | 11 | 0 = None 1 = Remote setpoint (with ratio) 2 = Remote setpoint (with ratio and bias) auto bias 3 = Feed forward (with ratio and bias) 4 = Sums input 143* (with ratio and bias) 5 = Input high select* (with ratio and bias) 6 = Input low select* (with ratio and bias) |
| PV High | 054 | 18 | –999 to +9999 in engineering units (Read only on loop 2) |
| PV Low | 055 | 18 | –999 to +9999 in engineering units (Read only on loop 2) |

*Not available on Loop 2.

6.11 Configuration Parameters - UDC 5000, Continued

Output algorithm

Table 6-22 lists all the I.D. codes and ranges or selections the function parameters in setup group “OUTPUT ALGORITHM.” Loop 1 or 2 selected by address in the request message.

Table 6-22 Setup Group-Output Algorithm

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Output Algorithm | 160 | 11 | 0 = None (loop 1) – disabled (loop 2) 1 = Position proportional (loop 1 only) 2 = Relay simplex 3 = Relay duplex (loop 1 only) 4 = Current 5 = Current duplex 6 = Relay/current (relay–heat, current–full) 7 = Relay/current (relay–cool, current–full) 8 = Current duplex (current out–cool, aux. out–heat) 9 = Relay/current (relay heat, current split) loop 1 only 10 = Relay/current (relay–cool, current–split) loop 1 only |
| Duplex Relay State at 0% Output (on Loop 1 address only) | 136 | 11 | 0 = Relay 1–de-energized Relay 2–de-energized 1 = Relay 1–energized Relay 2–de-energized 2 = Relay 1–de-energized Relay 2–energized 3 = Relay 1–energized Relay 2–energized |

6.11 Configuration Parameters - UDC 5000, Continued

Input 1

Table 6-23 lists all the I.D. codes and ranges or selections for the function parameters in setup group "INPUT 1."

Table 6-23 Setup Group-Input 1 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| Input 1 Type | 168 | 11 | 0 = B T/C** 1 = E T/C high 2 = J T/C high 3 = K T/C high 4 = Ni-Ni-Moly T/C high 5 = R T/C 6 = S T/C 7 = T T/C high 8 = W T/C high 11 = Nicrosil Nisil T/C 12 = 100 ohm plt RTD 13 = 100 ohm plt RTD RH 21-212°F range 14 = 200 ohm plt RTD 15 = 500 ohm plt RTD 19 = Radiamatic 22 = 0-20/4-20 mA 23 = 0-10 mV 24 = 10-50 mV 25 = 1-5 volts 26 = 0-10 volts 30 = E T/C low 31 = J T/C low 32 = K T/C low 33 = Ni-Ni-Moly T/C low |

6.11 Configuration Parameters - UDC 5000, Continued

Input 1, continued

Table 6-23 Setup Group-Input 1 (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| Input 1 Type, continued | 168 | 11 | 34 = T T/C low 35 = W T/C low 36 = 100 ohm plt RTD low |
| Input 1 Transmitter Characterization NOTE: Applicable when ID Code 168 equals 22, 23, 24, 25, or 26. | 169 | 11 | 0 = B T/C 1 = E T/C high 2 = J T/C high 3 = K T/C high 4 = Ni-Ni-Moly T/C high 5 = R T/C 6 = S T/C 7 = T T/C high 8 = W T/C high 11 = Nicrosil-Nisil T/C 12 = 100 plt RTD 13 = Plt RTD RH 21-212°F range 19 = Linear 20 = Square root 21 = E T/C low 22 = J T/C low 23 = K T/C low 24 = Ni-Ni-Moly T/C low 25 = T T/C low 26 = W T/C low 27 = 100 ohm plt RTD low 28 = 200 ohm plt RTD 29 = 500 ohm plt RTD |
| Input 1 High Range Value | 029 | 18 | –999. to 9999. engineering units |
| Input 1 Low Range Value | 030 | 18 | –999 to 9999. engineering units |

6.11 Configuration Parameters - UDC 5000, Continued

Input 1, continued

Table 6-23 Setup Group-Input 1 (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Input 1 Bias | 107 | 18 | –999 to 9999. engineering units |
| Input 1 Filter | 042 | 18 | 0 to 120 seconds |
| Input 1 Burnout | 164 | 11 | 0 = None and failsafe 1 = Upscale 2 = Downscale |
| Input 1 Emissivity | 023 | 18 | 0.01 to 1.00 |

*T/C = thermocouple

Input 2

Table 6-24 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 2.”

Table 6-24 Setup Group-Input 2 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| Input 2 Type | 170 | 11 | 0 = B T/C** 1 = E T/C high 2 = J T/C high 3 = K T/C high 4 = Ni-Ni-Moly T/C high 5 = R T/C 6 = S T/C 7 = T T/C high 8 = W T/C high 11 = Nicrosil Nisil T/C 12 = 100 ohm plt RTD 13 = 100 ohm plt RTD RH 21-212°F range 14 = 200 ohm plt RTD |

6.11 Configuration Parameters - UDC 5000, Continued

Input 2, continued

Table 6-24 Setup Group-Input 2 (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| Input 2 Type, continued | 170 | 11 | 15 = 500 ohm plt RTD 19 = Radiamatic 22 = 0-20/4-20 mA 23 = 0-10 mV 24 = 10-50 mV 25 = 1-5 volts 26 = 0-10 volts 28 = Carbon sensor 29 = Oxygen 30 = E T/C low 31 = J T/C low 32 = K T/C low 33 = Ni-Ni-Moly T/C low 34 = T T/C low 35 = W T/C low 36 = 100 ohm plt RTD low |
| Input 2 Transmitter Characterization NOTE: Applicable when ID Code 170 equals 22, 23, 24, 25, or 26. | 171 | 11 | 0 = B T/C** 1 = E T/C high 2 = J T/C high 3 = K T/C high 4 = Ni-Ni-Moly T/C high 5 = R T/C 6 = S T/C 7 = T T/C high 8 = W T/C high 11 = Nicrosil-Nisil T/C 12 = 100 plt RTD 13 = Plt RTD RH 21-212°F range |

6.11 Configuration Parameters - UDC 5000, Continued

Input 2, continued

Table 6-24 Setup Group-Input 2 (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Input 2 Transmitter Characterization, continued NOTE: Applicable when ID Code 170 equals 22, 23, 24, 25, or 26. | 171 | 11 | 19 = Linear 20 = Square root 21 = E T/C low 22 = J T/C low 23 = K T/C low 24 = Ni-Ni-Moly T/C low 25 = T T/C low 26 = W T/C low 27 = 100 ohm plt RTD low 28 = 200 ohm plt RTD 29 = 500 ohm plt RTD |
| Input 2 High Range Value | 035 | 18 | –999. to 9999. Engineering Units |
| Input 2 Low Range Value | 036 | 18 | –999 to 9999. Engineering Units |
| Input 2 Bias | 037 | 18 | –999 to 9999. Engineering Units |
| Input 2 Filter | 043 | 18 | 0 to 120 seconds |
| Input 2 Burnout | 165 | 11 | 0 = None and failsafe 1 = Upscale 2 = Downscale |
| Input 2 Emissivity | 044 | 18 | 0.01 to 1.00 |

*T/C = thermocouple

6.11 Configuration Parameters - UDC 5000, Continued

Input 3

Table 6-25 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 3.”

Table 6-25 Setup Group-Input 3 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 3 Type | 186 | 11 | 0 = OFF 19 = Linear NOTE: If 0 is received as a write, the input is disabled and the transmitter selection is lost. Whenever 19 is received as a write, if the input was previously disabled, the transmitter selection is set to linear with a range indeterminate; however, if the input was previously enabled, the transmitter type is unchanged. |
| Input 3 Transmitter Characterization | 187 | 11 | 0 = B T/C 1 = E T/C high 2 = J T/C high 3 = K T/C high 4 = Ni-Ni-Moly T/C high 5 = R T/C 6 = S T/C 7 = T T/C high 8 = W T/C high 11 = Nicrosil Nisil T/C 12 = 100 ohm plt RTD 19 = Linear 20 = Square root 21 = E T/C low 22 = J T/C low 23 = K T/C low 24 = Ni-Ni-Moly T/C low 25 = T T/C low 26 = W T/C low 27 = 100 ohm plt RTD low 28 = 200 ohm plt RTD 29 = 500 ohm plt RTD |
| Input 3 High Range Value | 108 | 18 | –999. to 9999. Engineering Units |

6.11 Configuration Parameters - UDC 5000, Continued

Input 3, continued

Table 6-25 Setup Group-Input 3 (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-------------------------|------------------|-------------|------------------------------------|
| Input 3 Low Range Value | 109 | 18 | –999 to 9999. Engineering Units |
| Input 3 Ratio | 110 | 18 | –20.00 to 20.00 |
| Input 3 Bias | 111 | 18 | –999 to 9999. Engineering Units |
| Input 3 Filter | 112 | 18 | 0 to 120 seconds |

6.11 Configuration Parameters - UDC 5000, Continued

Control and Control 2 Table 6-26 lists all the I.D. codes and ranges or selections for the function parameters in setup group “CONTROL OR CONTROL 2.” Loop 1 or 2 is selected by address in the request message.

Table 6-26 Setup Groups-Control and Control 2

| Parameter Description | Identifying Code | Format Code | Range or Selection | | | | | | | | | | | | | | | |
|---|--------------------------|------------------------|---|--|--------------------------|------------------------|------------|----|--------|------------|-----|--------|------------|----|----------|------------|-----|----------|
| Tuning Parameter Selection | 172 | 11 | 0 = One set only 1 = 2 sets keyboard selected 2 = 2 sets with PV automatic switchover 3 = 2 sets with Setpoint automatic switchover | | | | | | | | | | | | | | | |
| Automatic Switchover Value (used with 172 selection 2 or 3) | 056 | 18 | Within the PV Range in engineering units | | | | | | | | | | | | | | | |
| Local Setpoint Source | 173 | 11 | 0 = One Local Setpoint 1 = Two Local Setpoints 3 = Three Local Setpoints | | | | | | | | | | | | | | | |
| Local Setpoint Tracking/Power-up Output | 138 | 11 | <table><tr><td></td><td><u>Setpoint Tracking</u></td><td><u>Power-up Output</u></td></tr><tr><td>0 =</td><td>No</td><td>Recall</td></tr><tr><td>1 =</td><td>Yes</td><td>Recall</td></tr><tr><td>2 =</td><td>No</td><td>Failsafe</td></tr><tr><td>3 =</td><td>Yes</td><td>Failsafe</td></tr></table> | | <u>Setpoint Tracking</u> | <u>Power-up Output</u> | 0 = | No | Recall | 1 = | Yes | Recall | 2 = | No | Failsafe | 3 = | Yes | Failsafe |
| | <u>Setpoint Tracking</u> | <u>Power-up Output</u> | | | | | | | | | | | | | | | | |
| 0 = | No | Recall | | | | | | | | | | | | | | | | |
| 1 = | Yes | Recall | | | | | | | | | | | | | | | | |
| 2 = | No | Failsafe | | | | | | | | | | | | | | | | |
| 3 = | Yes | Failsafe | | | | | | | | | | | | | | | | |
| PV Tracking, Control Mode and Setpoint Recall | 130 | 11 | See table below | | | | | | | | | | | | | | | |

| PV Tracking | Control Model | Setpoint Mode |
|-------------|---------------|---------------|
| 0 = No | Manual | Local SP |
| 1 = Yes | Manual | Local SP |
| 2 = No | Last* | Last* |
| 3 = Yes | Last* | Last* |
| 4 = No | Last* | Last* |
| 5 = Yes | Last* | Last* |

| |
|---------------------------|
| *Last before power outage |
|---------------------------|

6.11 Configuration Parameters - UDC 5000, Continued

Control and Control 2, Table 6-26 Setup Groups-Control and Control 2, Continued
continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Control Setpoint High Limit | 007 | 18 | 0 to 100% of PV (Engineering Units) |
| Control Setpoint Low Limit | 008 | 18 | 0 to 100% of PV (Engineering Units) |
| Control Output Direction/Alarm Outputs | 135 | 11 | 0 = Direct Action Alarm Output energized 1 = Direct Action Alarm Output de-energized 2 = Reverse Action Alarm Output energized 3 = Reverse Action Alarm Output energized |
| High Output Limit | 014 | 18 | –5 to 105% of output |
| Low Output Limit | 015 | 18 | –5 to 105% of output |
| High Reset Limit | 016 | 18 | –5 to 105% of output |
| Low Reset Limit | 017 | 18 | –5 to 105% of output |
| Controller Output Dropoff | 139 | 11 | 0 = No dropout 1 = Dropout using ID Code 20 value |
| Controller Dropoff Value | 020 | 18 | –5 to 105% of output |
| Output Deadband | 018 | 18 | –5 to +25.0% |
| Output Hysteresis (Loop 1 address only) | 019 | 18 | 0 to 5.0% |
| Failsafe Output Level | 040 | 18 | 0 to 100% |
| Proportional Band Units (Loop 1 address only) applies to Loop 1 and 2 | 148 | 11 | 0 = Gain 1 = Proportional band |
| Reset Units (Loop 1 address only) applies to Loop 1 and 2 | 149 | 11 | 0 = Minutes 1 = RPM |

6.11 Configuration Parameters - UDC 5000, Continued

Options

Table 6-27 lists all the I.D. codes and ranges or selections for the function parameters in setup group “OPTIONS.” Loop 1 or 2 is selected by address in the request message.

Table 6-27 Setup Group-Options

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| 2nd Current Output | 134 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = PV – Loop 1 4 = Deviation – Loop 1 5 = Output – Loop 1 6 = Setpoint – Loop 1 7 = Input 3 8 = PV – Loop 2 9 = Deviation – Loop 2 10 = Output – Loop 2 11 = Setpoint – Loop 2 |
| Low Scaling Factor* | 049 | 18 | Within the range of the selected variable in I.D. 134 |
| High Scaling Factory* | 050 | 18 | Within the range of the selected variable in I.D. 134 |
| Digital Input #1* | 155 | 11 | 0 = None 1 = To Manual 2 = To Local Setpoint #1 3 = To Local Setpoint #2 4 = To Direct Action 5 = To Hold Ramp/SPP 6 = To PID Set #2 7 = PV = Input 2 8 = PV = Input 3 9 = To Run Ramp/SPP 10 = To Starting Segment (SPP) |
| Digital Input #2* | 156 | 11 | 0 = None 1 = To Manual 2 = To Local Setpoint #1 3 = To Local Setpoint #2 4 = To Direct Action 5 = To Hold Ramp/SPP 6 = To PID Set #2 7 = PV = Input 2 8 = PV = Input 3 9 = To Run Ramp/SPP 10 = To Starting Segment (SPP) |

*Loop 1 address only

6.11 Configuration Parameters - UDC 5000, Continued

Communications

Table 6-28 lists all the I.D. codes and ranges or selections for the function parameters in setup group “COMMUNICATIONS.” Loop 1 or 2 is selected in the request message.

Table 6-28 Setup Group-Communications

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Shed Time (Loop 1 address only) | 154 | 11 | 0 = No Shed 1 = 255 sample periods |
| Shed Mode and Output (Loop 1 address only) Selections apply to either loop | 162 | 11 | 0 = Last Mode and Last Output 1 = Manual Mode, Last Output 2 = Manual Mode, Failsafe Output 3 = Automatic Mode |
| Shed Setpoint Recall (Loop 1 address only) Selections apply to either loop | 163 | 11 | 0 = To Last Local Setpoint used 1 = Last Setpoint prior to Shed |
| Communication Override Units (Loop 1 address only) applies to Loop 1 and 2 | 161 | 11 | 0 = Percent 1 = Engineering Units |
| Computer Setpoint Ratio | 021 | 18 | –20.00 to 20.00 |
| Computer Setpoint Bias | 022 | 18 | –999 to 9999. |

6.11 Configuration Parameters - UDC 5000, Continued

Alarms

Table 6-29 lists all the I.D. codes and ranges or selections for the function parameters in setup group “ALARMS.”

Table 6-29 Setup Group-Alarms

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------|------------------|-------------|---|
| Alarm 1 Setpoint 1 Value | 009 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 1 Setpoint 2 Value | 010 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 2 Setpoint 1 Value | 011 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 2 Setpoint 2 Value | 012 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 1 Setpoint 1 Type | 140 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = PV – Loop 1 4 = Deviation – Loop 1 5 = Output – Loop 1 6 = Alarm on Shed 7 = SP Event ON 8 = SP Event OFF 9 = Input 3 10 = PV – Loop 2 11 = Deviation – Loop 2 12 = Output – Loop 2 |
| Alarm 1 Setpoint 2 Type | 142 | 11 | Same as 140 |
| Alarm 2 Setpoint 1 Type | 144 | 11 | Same as 140 |
| Alarm 2 Setpoint 2 Type | 146 | 11 | Same as 140 |
| Alarm 1 Setpoint 1 Event | 141 | 11 | 0 = Low Alarm or begin segment 1 = High Alarm or end segment |

6.11 Configuration Parameters - UDC 5000, Continued

Alarms, continued

Table 6-29 Setup Groups-Alarms, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------|------------------|-------------|---|
| Alarm 1 Setpoint 2 Event | 143 | 11 | 0 = Low Alarm or begin segment 1 = High Alarm or end segment |
| Alarm 2 Setpoint 1 Event | 145 | 11 | 0 = Low Alarm or begin segment 1 = High Alarm or end segment |
| Alarm 2 Setpoint 2 Event | 147 | 11 | 0 = Low Alarm or begin segment 1 = High Alarm or end segment |
| Alarm Hysteresis | 041 | 18 | 0.0 to 5.0% of output or span |

6.11 Configuration Parameters - UDC 5000, Continued

Display

Table 6-30 lists all the I.D. codes and ranges or selections for function parameters in setup group "DISPLAY." Loop 1 or 2 is selected by address in the request message.

Table 6-30 Setup Groups-Display

| Parameter Description | Identifying Code | Format Code | Range or Selection | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|------------------|-------------|---|-------|----------------|---------------|-------------|--------|---|--------|---|--------|---|--------|---|--------|---|--------|---|--------|---|----------|---|----------|---|-----------|---|-----------|---|
| Temperature Units and Decimal Point Place | 129 | 11 | <table><tr><th>Units</th><th>Decimal Places</th></tr><tr><td>0 = °F</td><td>0</td></tr><tr><td>1 = °C</td><td>0</td></tr><tr><td>2 = °F</td><td>1</td></tr><tr><td>3 = °C</td><td>1</td></tr><tr><td>4 = °F</td><td>2</td></tr><tr><td>5 = °C</td><td>2</td></tr><tr><td>6 = °F</td><td>3</td></tr><tr><td>7 = °C</td><td>3</td></tr><tr><td>8 = None</td><td>0</td></tr><tr><td>9 = None</td><td>1</td></tr><tr><td>10 = None</td><td>2</td></tr><tr><td>11 = None</td><td>3</td></tr></table> | Units | Decimal Places | 0 = °F | 0 | 1 = °C | 0 | 2 = °F | 1 | 3 = °C | 1 | 4 = °F | 2 | 5 = °C | 2 | 6 = °F | 3 | 7 = °C | 3 | 8 = None | 0 | 9 = None | 1 | 10 = None | 2 | 11 = None | 3 |
| Units | Decimal Places | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 = °F | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 = °C | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 = °F | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 = °C | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 = °F | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 = °C | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 = °F | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 = °C | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 = None | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 = None | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 = None | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 = None | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Power Frequency (Loop 1 address only) | 166 | 11 | <table><tr><td>0 = 60 Hertz</td></tr><tr><td>1 = 50 Hertz</td></tr></table> | | 0 = 60 Hertz | 1 = 50 Hertz | | | | | | | | | | | | | | | | | | | | | | | |
| 0 = 60 Hertz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 = 50 Hertz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bar graph Configuration | 191 | 11 | <table><tr><td>0 = Output</td></tr><tr><td>1 = Deviation</td></tr><tr><td>2 = Dev/Out</td></tr></table> | | 0 = Output | 1 = Deviation | 2 = Dev/Out | | | | | | | | | | | | | | | | | | | | | | |
| 0 = Output | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 = Deviation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 = Dev/Out | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Section 7 – Read, Write and Override Parameters on UDC 6000 Process Controllers

7.1 Overview

Introduction

This section contains information concerning Reading, Writing, and Overriding parameters on the UDC 6000 Process Controller. There are two types of parameters:

- Data Transfer—these parameters include reading control data, option status, and reading or changing setpoints or output.
- Configuration Data—all the configuration data is list in the order in which it appears in the controller.

Each type of parameter has the identifying codes listed with it. Follow the message exchange rules listed in “Read and Write Operations.”

7.1 Overview - UDC 6000, Continued

What's in this section This section contains the following topics:

| Topic | | See Page |
|-------|---|----------|
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| 7.2 | Reading Control Data | 130 |
| 7.3 | Read Option Status | 131 |
| 7.4 | Miscellaneous Read Only's | 132 |
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7.1 Overview - UDC 6000, Continued

General information

Analog Parameters

- Whenever analog parameters 001 through 114 (those that can be changed via communications) are changed, a Write cycle occurs immediately after receipt of the message.

Override Parameters

- Override analog parameters 120, 123 and 125 (PV, output, computer setpoint) are not stored in non-volatile memory and can be changed as frequently as desired with no effect on non-volatile memory retentivity, but controller must remain in slave mode.

Digital Parameters

- Whenever digital configuration parameters 128 through 250 are updated via communications, the non-volatile memory is updated as soon as the message is received.

7.2 Reading Control Data - UDC 6000

Overview

You can Read the following control data from the UDC controller.

- Input 1
- Input 2
- Input 3
- Input 4
- Input 5
- PV
- Internal RV
- PV, Setpoint, Output

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

I.D. codes

Use the identifying codes listed in Table 7-1 to read the specific items.

A Write request for these codes will result in an Error message.

Table 7-1 Control Data Parameters

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|------------------------------------|
| Input #1 | 118 | 18 | In Engineering Units or Percentage |
| Input #2 | 119 | 18 | In Engineering Units or Percentage |
| Input #3 | 117 | 18 | In Engineering Units or Percentage |
| Input #4 | 104 | 18 | In Engineering Units or Percentage |
| Input #5 | 105 | 18 | In Engineering Units or Percentage |
| PV | 120 | 18 | In Engineering Units or Percentage |
| Internal RV | 121 | 18 | In Engineering Units or Percentage |
| PV, Setpoint, and Output* | 122 | 18 | In Engineering Units or Percentage |

*This Read request will give a three variable response (see Read/Write operation).

7.3 Read Options Status - UDC 6000

Read

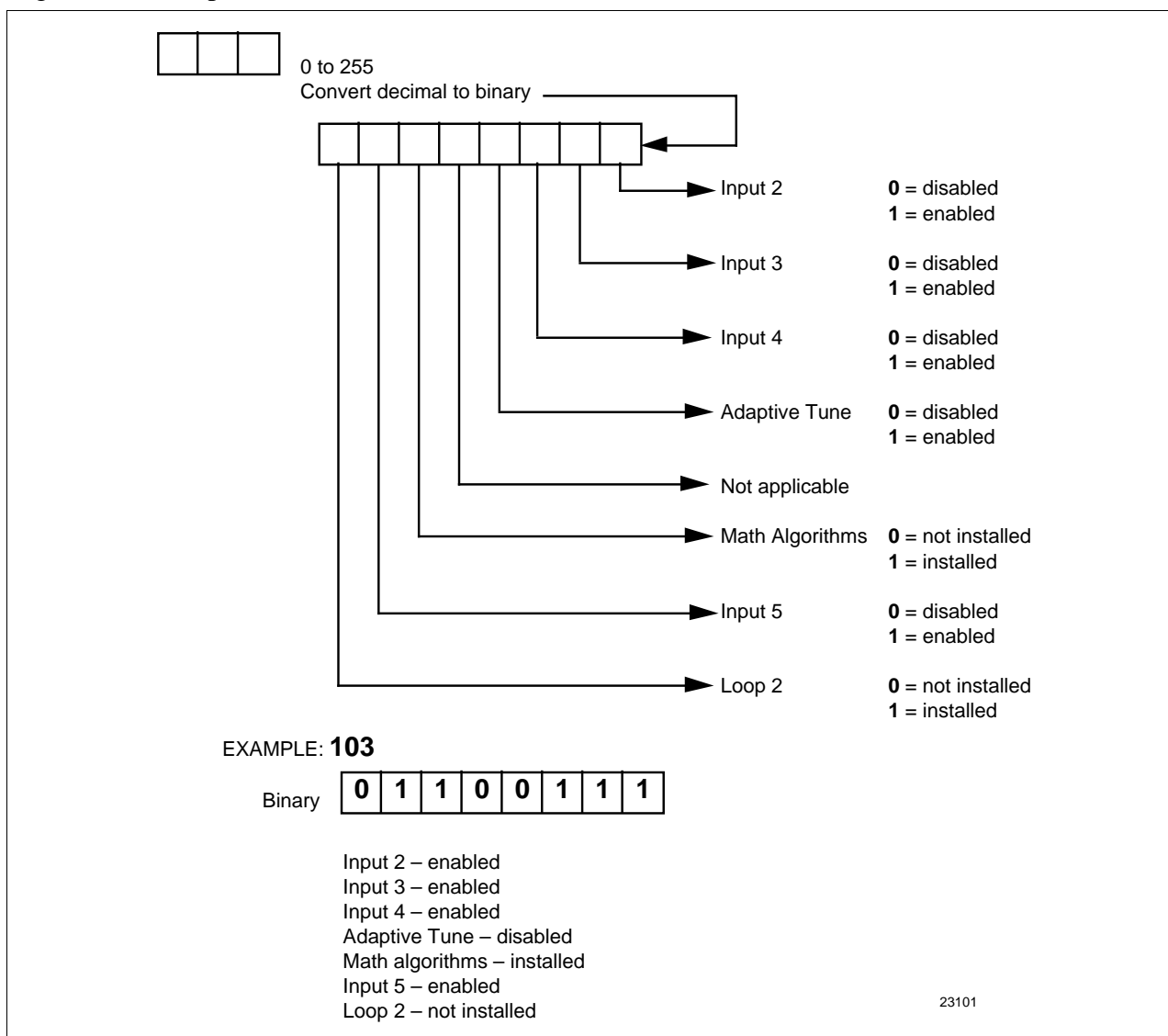
Doing a read of I.D. Code 185 listed in Table 7-2 will tell you which of the available options are enabled/installed or disabled/not installed.

Table 7-2 Option Status

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|--------------------|
| Option Status (Read only) | 185 | 11 | See Figure 7-1 |

The data field in the response message will be a decimal number from 0 to 255. Convert the decimal number to binary as shown in Figure 7-1 to determine which options are or are not active.

Figure 7-1 Option Status Information



7.4 Miscellaneous Read Only's - UDC 6000

I.D. codes for Read Only's

The identifying codes listed in Table 7-3 represent some information that are Read only. No Writes allowed.

Table 7-3 Miscellaneous Read Only's

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| Software Type | 157 | 11 | READ only (UDC 6000) 71 = Basic UDC 6000 software 72 = Field upgrade for Adaptive Tune 73 = Field upgrade for Adaptive Tune + Math 74 = Field upgrade for Adaptive Tune + 2 Loop 75 = Field Upgrade for all options |
| Software Version | 167 | 11 | READ only 0 to 99 |
| Digital Input Switch Status (Read only) | 190 | 11 | 0 = Switch #1 open Switch #2 open 1 = Switch #1 closed Switch #2 open 2 = Switch #1 open Switch #2 closed 3 = Switch #1 closed Switch #2 closed |
| UDC Error Status (Definitions are listed in Table 7-4) | 255 | 11 | See below READ/WRITE* 001 = Emergency Manual 002 = Failsafe 004 = Working Calibration Checksum Error 008 = Configuration Checksum Error 016 = Factory Calibration Error 032 = Hardware Failure 064 = Restart after Shed 128 = Configuration/Calibration Memory Changed |

*Write to clear.

For example:

If Read returns 192 (restart after shed-64 plus configuration change-128)

Write anything to I.D. Code 255

Read returns 000 (clear).

7.4 Miscellaneous Read Only's - UDC 6000, Continued

Error status definitions

Table 7-4 list the UDC error status codes and their definitions.

Table 7-4 Error Status Definitions

| Status Code | Error | Definitions |
|-------------|---|--|
| 001 | Emergency Manual | Indicates that the output of the unit which has been in slave operations, is under manual control, locally. Error remains until local control is relinquished at the controller. |
| 002 | Failsafe | Error occurs whenever the control reverts to failsafe operation and remains as long as the condition exists. |
| 004 | Working Calibration Checksum Error | Indicates that an error exists in the working calibration data. Re-select the inputs to load factory calibration data or field calibrate the inputs. |
| 008 | Configuration Checksum Error | Error exists in the configuration data. Verify configuration data at the keyboard. Checksum will be recomputed by stepping the controller through the status tests. |
| 016 | Factory Calibration Error | Error exists in the factory calibration data and remains as long as the conditions exists. |
| 032 | Hardware Failure | Indicates either a RAM tests failure or Input 1, Input 2, Input 3 failure on two consecutive conversions. |
| 064 | Restart After Shed | Error occurs whenever a shed of slave override is performed. Error is reset following a WRITE command to I.D. Code 255 (064). |
| 128 | Configuration /Calibration Memory Changed | Error occurs whenever shed, configuration, or calibration changed. Also occurs whenever there is a change of state in 001, 002, 004, 008, or 016. Error is reset following a Write command to I.D. Code 255. |

7.5 Setpoints - UDC 6000

Overview

You can use three separate local setpoints in the UDC Controller. The identifying codes listed Table 7-5 allow you to select which setpoint you want to use and to enter a value in Engineering Units or Percent (whichever is selected at Code 161) for that setpoint via communications.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

I.D. codes

Make your selection using I.D. Code 173 and enter the value for the setpoint chosen using ID Code 39 (SP1) or 53 (SP2) or 113 (SP3).

Table 7-5 Setpoint Code Selections

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Local Setpoint #1 | 039 | 18 | Value within the setpoint range limits |
| Local Setpoint #2 | 053 | 18 | Value within the setpoint range limits |
| Local Setpoint #3 | 113 | 18 | Value within the setpoint range limits |
| Local Setpoint Select | 173 | 11 | 000 = Local Setpoint #1 only 001 = 2nd Local Setpoint via keyboard or communications 003 = 3rd Local Setpoint via keyboard or communications |

Associated parameters

Refer to Table 7-6 to display or change any of the parameters associated with the setpoint.

Table 7-6 Setpoint Associated Parameters

| Parameter | Code |
|-------------------|----------|
| Setpoint Limits | 007, 008 |
| Computer Setpoint | 125 |

7.6 Using a Computer Setpoint (Overriding Controller Setpoint) - UDC 6000

Overview You can use a setpoint generated from the computer to override the setpoint being used by the controller.

The value generated by the computer will have ratio and bias applied by the controller.

I.D. codes Use the Identifying Code in Table 7-7 to enter the computer setpoint.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 7-7 Computer Setpoint Selection

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Computer Setpoint | 125 | 18 | Value from computer with Ratio/Bias applied by the controller. Within the Setpoint Range Limits in Engineering Units or Percent. |

Shed The computer setpoint override will continue until "SHED" from communications occurs or the controller is placed into monitor mode through communications. Doing periodic "SLAVE READS" within the shed time will allow the override to continue until communication is stopped and shed time elapses.

ATTENTION 0 Shed (code 154) allows the override to continue indefinitely or until the override is canceled. (See override selection ID Code 183.)

When SP is overridden, the left most digit in the upper display becomes a "C."

7.6 Using a Computer Setpoint (Overriding Controller Setpoint) - UDC 6000, Continued

Associated parameters

Refer to Table 7-8 for the codes to display or change any of the parameters associated with the computer setpoint.

Table 7-8 Computer Setpoint Associated Parameters

| Parameter | Code |
|---------------------------------|----------|
| Setpoint Limits | 007, 008 |
| Local Setpoint #1 | 039 |
| Local Setpoint #2 | 053 |
| Local Setpoint #3 | 113 |
| Local Setpoint Selection | 173 |
| Loop #1 Computer Setpoint Ratio | 021 |
| Loop #1 Computer Setpoint Bias | 022 |

7.7 PV or Setpoint Override Selections - UDC 6000

Overview You can Read the present override status or the PV or setpoint or you can do a write transaction to cancel the override.

I.D. codes Use the Identifying Code in Table 7-9 to Read or Write your selection.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 7-9 PV or Setpoint Override Selections

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------------|------------------|-------------|--------------------------|
| PV or Setpoint Override Selection | 183 | 11 | 04 = PV 08 = Setpoint |

7.8 Reading or Changing the Output - UDC 6000

Overview You can read the output of a particular UDC controller (Read transaction) or you can change it to suit your needs. (Do a Write transaction.)

I.D. codes Use the identifying code in Table 7-10 to monitor (Read) or change (Write the output (in manual only).

ATTENTION To Write (change) the output, the controller must first be in manual mode.

Table 7-10 Reading or Changing the Output

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Output | 123 | 18 | -5 to +105% of full span (current output) 0 to 100% (relay type output) |

Associated parameters Refer to Table 7-11 for the codes required to display or change any of the parameters associated with the output.

Table 7-11 Associated Output Codes

| Parameter | Code |
|------------------------|----------|
| Output Limits | 014, 015 |
| Output Dropoff Limits | 020 |
| Failsafe Output Values | 040 |
| Output Deadband | 018 |
| Output Hysteresis | 019 |
| Output Type | 160 |

7.9 Local Setpoint/PID Selection/Setpoint Ramp Status - UDC 6000

Overview

Identifying Code 250 lets you

- Monitor your Setpoint Ramp Status
 - In Progress, Not in Progress
 - In Run, On Holdand determine which tuning set and local setpoint is being used.
- Abort, Run, Hold, or Start and SP Ramp.
- Select Local Setpoint #1, #2, or #3.
- Select Tuning Parameter Set #1 or #2.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Read

When you do a Read, the code in Table 7-12 determines which parameters are active:

- Local Setpoint Selection
- Tuning Parameter Set Selection
- Setpoint Ramp Status

Table 7-12 I.D. Code 250 Reads

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--------------------|
| Read Local Set Point PID Set Selection and SP Ramp Status | 250 | 11 | See Figure 7-2 |

7.9 Local Setpoint/PID Selection/Setpoint Ramp Status - UDC 6000, Continued

Read, continued

Figure 7-2 I.D. Code 250 Indications

| | | | | | | |
|---|-----|-----|-----|-----|-----|-----|
| Tuning Set #2 Selection Local Set Point #3 Selection | | | | | | |
| Tuning Set #1 Selection Local Set Point #3 Selection | | | | | | |
| Tuning Set #2 Selection Local Set Point #2 Selection | | | | | | |
| Tuning Set #2 Selection Local Set Point #1 Selection | | | | | | |
| Tuning Set #1 Selection Local Set Point #2 Selection | | | | | | |
| Tuning Set #1 Selection Local Set Point #1 Selection | | | | | | |
| SET POINT RAMP INFORMATION (Note 1) | | | | | | |
| SP Ramp, Enabled not in progress | 000 | 008 | 016 | 024 | 032 | 048 |
| SP Ramp in progress, Hold | 002 | 010 | 018 | 026 | 034 | 050 |
| SP Ramp in progress, Run | 003 | 011 | 019 | 027 | 035 | 051 |

NOTE 1: This data is ignored in a Write command. Run/Hold set by Communications or by the Run/Hold key.

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7.9 Local Setpoint/PID Selection /Setpoint Ramp Status - UDC 6000, Continued

Write

A write of code 250 lets you change the SP ramp status as well as the local setpoint or tuning set selection. Refer to Table 7-13.

Table 7-13 I.D. Code 250 Writes

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Write Local Setpoint/PID Set Selection and SP Ramp Status | 250 | 11 | 000 = Abort SP Ramp 001 = Run SP Ramp 002 = Hold SP Ramp 003 = Start SP Ramp 004 = Change to Local Setpoint #1 005 = Change to Local Setpoint #2 006 = Change to PID Tuning Set #1 007 = Change to PID Tuning Set #2 008 = Change to Local Setpoint #3 |

ATTENTION

To enable or disable the setpoint ramp, refer to Identifying Code 150.

7.10 Configuration Parameters - UDC 6000

Overview

Listed on the next pages are the identifying codes for the parameters in the various Setup Groups in the UDC 6000 Process Controller. The table below lists the Setup Groups and their table numbers in which they are listed. Most of the parameters are configurable through the hosts. Some are Read Only and are indicated as such and cannot be changed.

| Setup Group | Table Number |
|-----------------------|--------------|
| TUNING | 7-14 |
| TUNING L2 | 7-15 |
| SP RAMP | 7-16 |
| ADAPTIVE | 7-17 |
| ALGORITHM | 7-18 |
| ADVANCED MATH | 7-19 |
| OUTPUT ALGORITHM | 7-20 |
| INPUT 1 | 7-21 |
| INPUT 2 | 7-22 |
| INPUT 3 | 7-23 |
| INPUT 4 | 7-24 |
| INPUT 5 | 7-25 |
| CONTROL AND CONTROL 2 | 7-26 |
| OPTIONS | 7-27 |
| COMMUNICATIONS | 7-28 |
| ALARMS | 7-29 |
| DISPLAY | 7-30 |

Reading or writing

Do a Read or Write (see “Read/Write Operations”), depending on your requirements using the identifying code and format code listed in the tables. The range or selection available for each range is listed in the tables.

7.10 Configuration Parameters - UDC 6000, Continued

Tuning

Table 7-14 lists all the I.D. codes and ranges or selections for the function parameters in the setup Group “TUNING” (Loop 1).

Table 7-14 Setup Group-Tuning (Loop 1)*

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Gain #1 or PB | 001 | 18 | 0.01 to 1000 |
| Rate #1 | 002 | 18 | 0.00 to 10.00 |
| Reset #1 | 003 | 18 | 0.02 to 50.00 |
| Manual Reset | 013 | 18 | -100 to +100 |
| Gain #2 or PB | 004 | 18 | 0.01 to 1000 |
| Rate #2 | 005 | 18 | 0.00 to 10.00 |
| Reset #2 | 006 | 18 | 0.02 to 50.00 |
| Cycle Time #1 | 158 | 11 | 1 to 120 seconds |
| Cycle Time #2 | 159 | 11 | 1 to 120 seconds |
| Lockout (keyboard only) Changes to data always possible via communications regardless of this configuration. | 132 | 11 | 0 = None 1 = Calibration + Configuration 2 = Max Lockout 3 = Calibration only 4 = Calibration + Configuration + View |
| PV1 Value gain scheduling | 001** | 48 | –9999 to 9999 |
| PV2 Value gain scheduling | 002** | 48 | –9999 to 9999 |
| PV3 Value gain scheduling | 003** | 48 | –9999 to 9999 |
| PV4 Value gain scheduling | 004** | 48 | –9999 to 9999 |
| PV5 Value gain scheduling | 005** | 48 | –9999 to 9999 |
| PV6 Value gain scheduling | 006** | 48 | –9999 to 9999 |
| PV7 Value gain scheduling | 007** | 48 | –9999 to 9999 |

7.10 Configuration Parameters - UDC 6000, Continued

Tuning, continued

Table 7-14 Setup Group-Tuning (Loop 1)*, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------|------------------|-------------|--------------------|
| PV8 Value gain scheduling | 008** | 48 | –9999 to 9999 |
| Gain 1 value gain scheduling | 009** | 48 | 0.1 to 999.9 |
| Gain 2 value gain scheduling | 010** | 48 | 0.1 to 999.9 |
| Gain 3 value gain scheduling | 011** | 48 | 0.1 to 999.9 |
| Gain 4 value gain scheduling | 012** | 48 | 0.1 to 999.9 |
| Gain 5 value gain scheduling | 013** | 48 | 0.1 to 999.9 |
| Gain 6 value gain scheduling | 014** | 48 | 0.1 to 999.9 |
| Gain 7 value gain scheduling | 015** | 48 | 0.1 to 999.9 |
| Gain 8 value gain scheduling | 016** | 48 | 0.1 to 999.9 |

*Loop selected by address in request message.

**Extended Codes—Use Format Code 48.

7.10 Configuration Parameters - UDC 6000, Continued

Tuning 2

Table 7-15 lists all the I.D. codes and ranges or selections for the function parameters in the setup Group “TUNING 2.”

Table 7-15 Setup Group-Tuning 2* (Loop 2)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------|------------------|-------------|--------------------|
| Gain #3 or PB | 001 | 18 | 0.1 to 1000 |
| Rate #3 | 002 | 18 | 0.00 to 10.00 |
| Reset #3 | 003 | 18 | 0.02 to 50.00 |
| Man 3 Reset | 013 | 18 | –100 to +100 |
| Gain #4 or PB | 004 | 18 | 0.1 to 1000 |
| Rate #4 | 005 | 18 | 0.00 to 10.00 |
| Reset #4 | 006 | 18 | 0.02 to 50.00 |
| Cycle Time #3 | 158 | 11 | 1 to 120 seconds |
| Cycle Time #4 | 159 | 11 | 1 to 120 seconds |
| PV1 Value gain scheduling | 001** | 48 | –9999 to 9999 |
| PV2 Value gain scheduling | 002** | 48 | –9999 to 9999 |
| PV3 Value gain scheduling | 003** | 48 | –9999 to 9999 |
| PV4 Value gain scheduling | 004** | 48 | –9999 to 9999 |
| PV5 Value gain scheduling | 005** | 48 | –9999 to 9999 |
| PV6 Value gain scheduling | 006** | 48 | –9999 to 9999 |
| PV7 Value gain scheduling | 007** | 48 | –9999 to 9999 |
| PV8 Value gain scheduling | 008** | 48 | –9999 to 9999 |
| Gain 1 value gain scheduling | 009** | 48 | 0.1 to 999.9 |

**Extended Codes—Use Format Code 48.

7.10 Configuration Parameters - UDC 6000, Continued

Tuning 2, continued

Table 7-15 Setup Group-Tuning 2* (Loop 2), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------|------------------|-------------|--------------------|
| Gain 2 value gain scheduling | 010** | 48 | 0.1 to 999.9 |
| Gain 3 value gain scheduling | 011** | 48 | 0.1 to 999.9 |
| Gain 4 value gain scheduling | 012** | 48 | 0.1 to 999.9 |
| Gain 5 value gain scheduling | 013** | 48 | 0.1 to 999.9 |
| Gain 6 value gain scheduling | 014** | 48 | 0.1 to 999.9 |
| Gain 7 value gain scheduling | 015** | 48 | 0.1 to 999.9 |
| Gain 8 value gain scheduling | 016** | 48 | 0.1 to 999.9 |

* Loop selected by address in request message.

**Extended Codes—Use Format Code 48.

7.10 Configuration Parameters - UDC 6000, Continued

SP ramp/rate

Table 7-16 lists all the I.D. codes and ranges or selections for the function parameters in setup group “SP RAMP/RATE.” Loop 1 or 2 selected by address in request message.

Table 7-16 Setup Group-Setpoint Ramp/Rate

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Setpoint Ramp Enable NOTE: Cannot be enabled if Setpoint Rate is enabled. | 150 | 11 | 0 = OFF 2 = SP Ramp enabled – Loop 1 3 = SP Ramp enabled – Loop 2 4 = SP Ramp enabled – both loops |
| Single SP Ramp Time | 174 | 11 | 0 to 255 (minutes) applies to whichever loop has SP Ramp configured |
| Final Ramp SP Value | 026 | 18 | PV Range in engineering units |
| Setpoint Rate Enable NOTE: Cannot be enabled if Setpoint Ramp is enabled. | 180 | 11 | 0 = OFF 1 = SP Rate enabled – Loop 1 2 = SP Rate enabled – Loop 2 3 = SP Rate enabled – both loops |
| SP Rate Up Value | 057 | 18 | 0 to 9999 |
| SP Rate Down Value | 058 | 18 | 0 to 9999 |

7.10 Configuration Parameters - UDC 6000, Continued

Adaptive Tune

Table 7-17 lists all the I.D. codes and ranges or selections for the function parameters setup group “ADAPTIVE TUNE.” Loop 1 or 2 is selected by address in request message.

Table 7-17 Setup Group-Adaptive Tune

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------------|------------------|-------------|---|
| Adaptive Tune Enable – Loop 1 | 152 | 11 | 0 = Disabled 7 = SP Tune 8 = SP + PV Tune |
| Setpoint Change | 153 | 11 | 5 to 15% span |
| Process Gain | 114 | 18 | 0.01 to 50.0 |
| Adaptive Tune Error (Read only) | 151 | 11 | 0 = None 1 = Output less than or greater than Output Limits 2 = Output greater or less than Heat/Cool Limits 3 = Not applicable 4 = PV change not sufficient 5 = Process Identification failed 6 = Calculated Reset outside Reset Limits 7 = Calculated Gain outside Gain Limits 8 = Adaptive tune aborted on command 9 = Input 1 error detected 10 = Adaptive Tune illegal during Ramp 11 = Adaptive Tune aborted when external switch detected. 12 = Running |

7.10 Configuration Parameters - UDC 6000, Continued

Algorithm

Table 7-18 lists all the I.D. codes and ranges or selections for the Function Parameters in setup group “ALGORITHM.” Loop 1 or 2 is selected is the request message.

Table 7-18 Setup Group-Algorithm

| Parameter Description | Identifying Code | Format Code | Range or Selection | | | | | | | | | | | | | | | |
|--|------------------|-------------|--|--|--------|--------|-----|-----|----------|-----|----|----------|-----|----|----|-----|----|----|
| Loop Rate (conversion/ second) (on Loop 1 address only) | 192 | 11 | <table><tr><th></th><th>Loop 1</th><th>Loop 2</th></tr><tr><td>0 =</td><td>12x</td><td>disabled</td></tr><tr><td>1 =</td><td>9x</td><td>disabled</td></tr><tr><td>2 =</td><td>6x</td><td>3x</td></tr><tr><td>3 =</td><td>3x</td><td>3x</td></tr></table> | | Loop 1 | Loop 2 | 0 = | 12x | disabled | 1 = | 9x | disabled | 2 = | 6x | 3x | 3 = | 3x | 3x |
| | Loop 1 | Loop 2 | | | | | | | | | | | | | | | | |
| 0 = | 12x | disabled | | | | | | | | | | | | | | | | |
| 1 = | 9x | disabled | | | | | | | | | | | | | | | | |
| 2 = | 6x | 3x | | | | | | | | | | | | | | | | |
| 3 = | 3x | 3x | | | | | | | | | | | | | | | | |
| Control Algorithm Selection †Not available for Loop 2 | 128 | 11 | 0 = ON/OFF† 1 = PID-A 2 = PID-B 3 = PD-A with Manual Reset 4 = Three Position Step† | | | | | | | | | | | | | | | |
| Loop 2 Selection (Loop 2 address only) | 168 | 11 | 0 = Loop 1 only 1 = Loop 2 enabled 2 = Loop 1 and 2 are cascaded. Loop 2 primary – Loop 1 secondary. | | | | | | | | | | | | | | | |
| Output Override Hi or Lo Select (on Loop 2 address only – Loop 1 Output in Auto) | 136 | 11 | 0 = Disabled 1 = Hi Select 2 = Lo Select | | | | | | | | | | | | | | | |

7.10 Configuration Parameters - UDC 6000, Continued

Algorithm, continued Table 7-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------------------|-------------|---|
| Input Algorithm 1 †Input source selected via ID 193, 194, 195. | 131 | 11 | 0 = None 3 = Weighted Average† 8 = Feed forward - Summer† 13 = Multiplier Divident† 14 = Multiplier† 15 = Multiplier Divident† 16 = Multiplier† 17 = Summer (with Ratio and Bias)† 18 = Input Hi Select (with Ratio and Bias)† 19 = Input Lo Select (with Ratio and Bias)† 25 =Feedforward/ Multiplier |
| Input Algorithm 2 †Input source selected via ID 164, 165, 188. | 137 | 11 | 0 = None 3 = Weighted Average† 8 = Feed forward - Summer† 13 = Multiplier Divident† 14 = Multiplier† 15 = Multiplier Divident† 16 = Multiplier† 17 = Summer (with Ratio and Bias)† 18 = Input Hi Select (with Ratio and Bias)† 19 = Input Lo Select (with Ratio and Bias)† 25 =Feedforward/ Multiplier |
| Constant K for Math Algorithms | 045 | 18 | 0.001 to 1000 |
| Calc High | 054 (Loop 1) 051 (Loop 2) | 18 | –999 to +9999 in Engineering Units |
| Calc Low | 055 (Loop 1) 052 (Loop 2) | 18 | –999 to +9999 in Engineering Units |
| Constant K for Math Algorithm 2 | 047 | 18 | 0.001 to 1000 |

7.10 Configuration Parameters - UDC 6000, Continued

Algorithm, continued Table 7-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Input Algorithm 1 Input A Selection (used with ID 131 math calculations) | 193 | 11 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 |
| Input Algorithm 1 Input B Selection (used with ID 131 math calculations) | 194 | 11 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 |
| Input Algorithm 1 Input C Selection (used with ID 131 math calculations) | 195 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = Input 3 4 = Input 4 5 = Input 5 |
| Input Algorithm 2 Input A Selection (used with ID 137 math calculations) | 164 | 11 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 |
| Input Algorithm 2 Input B Selection (used with ID 137 math calculations) | 165 | 11 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 |
| Input Algorithm 2 Input C Selection (used with 137 math calculations) | 188 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = Input 3 4 = Input 4 5 = Input 5 |
| 8-segment Characterizer | 179 | 11 | 0 = Disable 1 = Input 2 2 = Loop 1 – Output 3 = Loop 2 – Output |

7.10 Configuration Parameters - UDC 6000, Continued

Algorithm, continued Table 7-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| X0 Input to 8-segment characterizer | 059 | 18 | 0 to 99.99 |
| X1 Input | 060 | 18 | 0 to 99.99 |
| X2 Input | 061 | 18 | 0 to 99.99 |
| X3 Input | 062 | 18 | 0 to 99.99 |
| X4 Input | 063 | 18 | 0 to 99.99 |
| X5 Input | 064 | 18 | 0 to 99.99 |
| X6 Input | 065 | 18 | 0 to 99.99 |
| X7 Input | 066 | 18 | 0 to 99.99 |
| X8 Input | 067 | 18 | 0 to 99.99 |
| Y0 Output from 8-segment Characterizer | 068 | 18 | 0 to 99.99 |
| Y1 Output | 069 | 18 | 0 to 99.99 |
| Y2 Output | 070 | 18 | 0 to 99.99 |
| Y3 Output | 071 | 18 | 0 to 99.99 |
| Y4 Output | 072 | 18 | 0 to 99.99 |
| Y5 Output | 073 | 18 | 0 to 99.99 |
| Y6 Output | 074 | 18 | 0 to 99.99 |
| Y7 Output | 075 | 18 | 0 to 99.99 |
| Y8 Output | 076 | 18 | 0 to 99.99 |
| Polynomial | 181 | 11 | 0 = Disable 1 = Input 1 2 = Input 2 3 = Input 3 4 = Input 4 5 = Input 5 |

7.10 Configuration Parameters - UDC 6000, Continued

Algorithm, continued Table 7-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| C0 – Polynomial Coefficient | 081 | 18 | –99.99 to 99.99 |
| C1 – Coefficient | 082 | 18 | –9.999 to 9.999 |
| C2 – Coefficient | 083 | 18 | –9.999 to 9.999 |
| C3 – Coefficient | 084 | 18 | –9.999 to 9.999 |
| C4 – Coefficient | 085 | 18 | –9.999 to 9.999 |
| C5 – Coefficient | 086 | 18 | –9.999 to 9.999 |
| Totalizer | 184 | 11 | 0 = Disable 1 = Input 1 2 = Input Algorithm 1 3 = Input Algorithm 2 |
| Totalizer Scale Factor (display only) | 175 | 11 | 0 = $10^0 = 1$ 1 = $10^1 = 10$ 2 = $10^2 = 100$ 3 = $10^3 = 1,000$ 4 = $10^4 = 10,000$ 5 = $10^5 = 100,000$ 6 = $10^6 = 1,000,000$ |
| Totalizer Reset Lock (when locked, totalizer cannot be reset from keyboard) | 176 | 11 | 0 = Unlock 1 = Lock |
| Current Totalizer Value | 103 | 11 | 0 to $10^{14}-1$ NOTE: A value of "0" may be written to reset the totalizer. A write of any other value is not accepted. |
| Totalizer Integration Rate | 177 | 11 | 0 = Second 1 = Minute 2 = Hour 3 = Day 4 = Million/Day |

7.10 Configuration Parameters - UDC 6000, Continued

Advanced math

Table 7-19 lists all the I.D. codes and ranges and selections for the function parameters in setup group “ADVANCED MATH.” Loop 1 or 2 is selected request message.

Table 7-19 Setup Group-Advanced Math

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Logic Gates | 128** | 41 | 0 = Disable 1 = Enable |
| Gate 1 Type | 129** | 41 | 0 = Not Used 1 = OR 2 = NOR 3 = AND 4 = NAND 5 = XOR 6 = XNOR 7 = BLTA 8 = BGTA |
| Gate 1 Input A (for gate types 1 through 6) | 130** | 41 | 0 = Digital Input 1 1 = Digital Input 2 2 = Digital Output 1 3 = Digital Output 2 4 = Digital Output 3 5 = Digital Output 4 6 = Output from gate 1 7 = Output from gate 2 8 = Output from gate 3 9 = Output from gate 4 10 = Output from gate 5 11 = Fixed on – always “1” 12 = Fixed off – always “0” 13 = Manual/Auto mode 14 = Local/Remote SP 15 = Disable/Enable Adaptive Tune 16 = Manual/Auto Mode (Loop 2 only) |

**Extended Code—Use Format Code 41.

7.10 Configuration Parameters - UDC 6000, Continued

Advanced math,
continued

Table 7-19 Setup Group-Advanced Math, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Gate 1 Input A (for gate types 1 through 6), Continued | 130** | 41 | 17 = Local/Remote SP (Loop 2 only) 18 = Disable/Enable Adaptive Tune (Loop 2 only) |
| Gate 1 Input A (for gate type 7 or 8) | 131** | 41 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 5 = Loop 1 PV 6 = Loop 1 SP 7 = Constant K 8 = Loop 2 PV (Loop 2 address only) 9 = Loop 2 SP (Loop 2 address only) |
| Gate 1 Input A "K" Value (appears only if selection 7 – Constant K is made at ID Code 131) | 017*** | 48 | –999.0 to 9999 |
| Gate 1 Input B (for gate types 1 through 6) | 132** | 41 | Same as 130 |
| Gate 1 Input B (for gate type 7 or 8) | 133** | 41 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 5 = Loop 1 PV 6 = Loop 1 SP 7 = Totalizer 8 = Loop 2 PV (Loop 2 address only) 9 = Loop 2 SP (Loop 2 address only) |

**Extended Code—Use Format Code 41.

***Extended Codes—Use Format Code 48.

7.10 Configuration Parameters - UDC 6000, Continued

Advanced math,
continued

Table 7-19 Setup Group-Advanced Math, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Gate 1 Output | 134** | 41 | 0 = Digital Output 1 1 = Digital Output 2 2 = Digital Output 3 3 = Digital Output 4 4 = Any Gate 5 = Manual/Auto Mode 6 = Local/Remote SP 7 = Disable/Enable Adaptive 8 = Reset Totalizer 9 = Manual/Auto Mode (Loop 2 address only) 10 = Local/Remote SP (Loop 2 address only) 11 = Disable/Enable Adaptive Tune (Loop 2 address only) |
| Gate 2 Type | 135** | 41 | Same as 129 |
| Gate 2 Input A (for gate types 1 through 6) | 136** | 41 | Same as 130 |
| Gate 2 Input A (for gate type 7 or 8) | 137** | 41 | Same as 131 |
| Gate 2 Input A "K" Value (appears only if selection 7 – Constant K is made at ID code 137) | 018*** | 48 | –999.0 to 9999 |
| Gate 2 Input B (for gate types 1 through 6) | 138** | 41 | Same as 130 |
| Gate 2 Input B (for gate type 7 or 8) | 139** | 41 | Same as 133 |
| Gate 2 Output | 140** | 41 | Same as 134 |
| Gate 3 Type | 141** | 41 | Same as 129 |

**Extended Code—Use Format Code 41.

***Extended Codes—Use Format Code 48.

7.10 Configuration Parameters - UDC 6000, Continued

Advanced math,
continued

Table 7-19 Setup Group-Advanced Math, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--------------------|
| Gate 3 Input A (for gate types 1 through 6) | 142** | 41 | Same as 130 |
| Gate 3 Input A (for gate type 7 or 8) | 143** | 41 | Same as 131 |
| Gate 3 Input A "K" Value (appears only if selection 7 – Constant K is made at ID code 143) | 019*** | 48 | –999.0 to 9999 |
| Gate 3 Input B (for gate types 1 through 6) | 144** | 41 | Same as 130 |
| Gate 3 Input B (for gate type 7 or 8) | 145** | 41 | Same as 133 |
| Gate 3 Output | 146** | 41 | Same as 134 |
| Gate 4 Type | 147** | 41 | Same as 129 |
| Gate 4 Type A (for gate types 1 through 6) | 148** | 41 | Same as 130 |
| Gate 4 Input A (for gate type 7 or 8) | 149** | 41 | Same as 131 |
| Gate 4 Input A "K" Value (appears only if selection 7 – Constant K is made at ID code 149) | 020*** | 48 | –999.0 to 9999 |
| Gate 4 Input B (for gate types 1 through 6) | 150** | 41 | Same as 130 |
| Gate 4 Input B (for gate type 7 or 8) | 151** | 41 | Same as 133 |
| Gate 4 Output | 152** | 41 | Same as 134 |
| Gate 5 Type | 153** | 41 | Same as 129 |

**Extended Code—Use Format Code 41.

***Extended Codes—Use Format Code 48.

7.10 Configuration Parameters - UDC 6000, Continued

Advanced math,
continued

Table 7-19 Setup Group-Advanced Math, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--------------------|
| Gate 5 Input A (for gate types 1 through 6) | 154** | 41 | Same as 130 |
| Gate 5 Input A (for gate type 7 or 8) | 155** | 41 | Same as 131 |
| Gate 5 Input A "K" Value (appears only if selection 7 – Constant K is made at ID code 151) | 021*** | 48 | –999.0 to 9999 |
| Gate 5 Input B (for gate types 1 through 6) | 156** | 41 | Same as 130 |
| Gate 5 Input B (for gate type 7 or 8) | 157** | 41 | Same as 133 |
| Gate 5 Output | 158** | 41 | Same as 134 |

**Extended Code—Use Format Code 41.

***Extended Codes—Use Format Code 48.

7.10 Configuration Parameters - UDC 6000, Continued

Output Algorithm

Table 7-20 lists all the I.D. codes and ranges or selections for the function parameters in setup group “OUTPUT ALGORITHM.” Loop 1 or 2 is selected in the request message.

Table 7-20 Setup Group-Output Algorithm

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Output Algorithm | 160 | 11 | 0 = None (Loop 1) – Disabled (Loop 2) 2 = Time Simplex 3 = Time Duplex (Loop 1 only) 4 = Current 5 = Current Duplex 6 = Relay/Current - Relay on Heat, Current full 7 = Current/Relay - Relay on Cool, Current full 8 = Current Duplex 9 = Relay/Current - Relay on Heat, Current Split 10 = Relay/Current - Relay on Cool, Current Split |
| Digital Output State at 0% Output (on Loop 1 address only) | 136 | 11 | 0 = Out 3 de-energized Out 4 de-energized 1 = Out 3 energized Out 4 de-energized 2 = Out 3 de-energized Out 4 energized 3 = Out 3 energized Out 4 energized |

7.10 Configuration Parameters - UDC 6000, Continued

Input 1

Table 7-21 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 1.”

Table 7-21 Setup Group-Input 1 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 1 Type | 168 | 11 | 0 = OFF 27 = Linear NOTE: If 0 is received as a write, the input is disabled and the transmitter selection is lost. Whenever 27 is received as a write, if the input was previous disabled, the transmitter selection is set to linear with a range indeterminate; however, if the input was previously enabled, the transmitter type is unchanged. |
| Input 1 Transmitter Characterization | 169 | 11 | 0 = B T/C 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 11 = Nicrosil-Nisil T/C 12 = 100 Pt RTD 19 = Linear 20 = Sq. Root 27 = 100 Pt RTD Low 28 = 200 Pt RTD 29 = 500 Pt RTD |
| Input 1 High Range Value | 029 | 18 | –999. to 9999. Engineering Units |
| Input 1 Low Range Value | 030 | 18 | –999 to 9999. Engineering Units |
| Input 1 Ratio | 106 | 18 | –20.00 to 20.00 |
| Input 1 Bias | 107 | 18 | –999 to 9999. Engineering Units |
| Input 1 Filter | 042 | 18 | 0 to 120 seconds |

7.10 Configuration Parameters - UDC 6000, Continued

Input 2

Table 7-22 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 2.”

Table 7-22 Setup Group-Input 2 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 2 Type | 170 | 11 | 0 = OFF 27 = Linear NOTE: If 0 is received as a write, the input is disabled and the transmitter selection is lost. Whenever 27 is received as a write, if the input was previous disabled, the transmitter selection is set to linear with a range indeterminate; however, if the input was previously enabled, the transmitter type is unchanged. |
| Input 2 Transmitter Characterization | 171 | 11 | 0 = B T/C 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 11 = Nicrosil-Nisil T/C 12 = 100 Pt RTD 19 = Linear 20 = Sq. Root 27 = 100 Pt RTD Low 28 = 200 Pt RTD 29 = 500 Pt RTD |
| Input 2 High Range Value | 035 | 18 | –999. to 9999. Engineering Units |
| Input 2 Low Range Value | 036 | 18 | –999 to 9999. Engineering Units |
| Input 2 Ratio | 037 | 18 | –20.00 to 20.00 |
| Input 2 Bias | 038 | 18 | –999 to 9999. Engineering Units |
| Input 2 Filter | 043 | 18 | 0 to 120 seconds |

7.10 Configuration Parameters - UDC 6000, Continued

Input 3

Table 7-23 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 3.”

Table 7-23 Setup Group-Input 3 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 3 Type | 186 | 11 | 0 = OFF 27 = Linear NOTE: If 0 is received as a write, the input is disabled and the transmitter selection is lost. Whenever 27 is received as a write, if the input was previous disabled, the transmitter selection is set to linear with a range indeterminate; however, if the input was previously enabled, the transmitter type is unchanged. |
| Input 3 Transmitter Characterization | 187 | 11 | 0 = B T/C 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 11 = Microsil-Nisil T/C 12 = 100 Pt RTD 19 = Linear 20 = Sq. Root 27 = 100 Pt RTD Low 28 = 200 Pt RTD 29 = 500 Pt RTD 30 = IN2 no Ratio/Bias |
| Input 3 High Range Value | 108 | 18 | –999. to 9999. engineering units |
| Input 3 Low Range Value | 109 | 18 | –999 to 9999. engineering units |
| Input 3 Ratio | 110 | 18 | –20.00 to 20.00 |
| Input 3 Bias | 111 | 18 | –999 to 9999. engineering units |
| Input 3 Filter | 112 | 18 | 0 to 120 seconds |
| Input 3 Deadtime | 98 | 18 | 0 to 60 minutes |

7.10 Configuration Parameters - UDC 6000, Continued

Input 4

Table 7-24 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 4.”

Table 7-24 Setup Group-Input 4 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 4 Type | 202 | 11 | 0 = OFF 27 = Linear NOTE: If 0 is received as a write, the input is disabled and the transmitter selection is lost. Whenever 27 is received as a write, if the input was previous disabled, the transmitter selection is set to linear with a range indeterminate; however, if the input was previously enabled, the transmitter type is unchanged. |
| Input 4 Transmitter Characterization | 203 | 11 | 0 = B T/C 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 11 = Nicrosil-Nisil T/C 12 = 100 Pt RTD 19 = Linear 20 = Sq. Root 27 = 100 Pt RTD Low 28 = 200 Pt RTD 29 = 500 Pt RTD |
| Input 4 High Range Value | 087 | 18 | –999. to 9999. engineering units |
| Input 4 Low Range Value | 088 | 18 | –999 to 9999. engineering units |
| Input 4 Ratio | 089 | 18 | –20.00 to 20.00 |
| Input 4 Bias | 090 | 18 | –999 to 9999. engineering units |
| Input 4 Filter | 091 | 18 | 0 to 120 seconds |

7.10 Configuration Parameters - UDC 6000, Continued

Input 5

Table 7-25 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 5.”

Table 7-25 Setup Group-Input 5 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Input 5 Type | 204 | 11 | 0 = OFF 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 9 = B T/C 11 = Microsil Nisil T/C 12 = 100 Pt RTD 14 = 200 Pt RTD 15 = 500 Pt RTD 19 = Radimatic 22 = 4-20 mA 23 = 0-10 mV 24 = 10-50 mV 25 = 1 to 5 volts 26 = 0 to 10 volts 36 = 100 Pt RTD Low 37 = Pulse (only when pulse input board is installed) |
| Input 5 Type (when pulse input is installed – i.e. 37 above) | 207 | 11 | 0 = Disabled 1 = Frequency Input 2 = Pulse Input |

7.10 Configuration Parameters - UDC 6000, Continued

Input 5, continued

Table 7-25 Setup Group-Input 5 (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 5 Transmitter Characterization | 205 | 11 | 0 = B T/C 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 11 = Nicrosil-Nisil T/C 12 = 100 Pt RTD 19 = Linear 20 = Sq. Root 27 = 100 Pt RTD Low 28 = 200 Pt RTD 29 = 500 Pt RTD |
| Input 5 High Range Value | 092 | 18 | –999. to 9999. engineering units |
| Input 5 Low Range Value | 093 | 18 | –999 to 9999. engineering units |
| Input 5 Ratio | 094 | 18 | –20.00 to 20.00 |
| Input 5 Bias | 095 | 18 | –999 to 9999. engineering units |
| Input 5 Filter | 096 | 18 | 0 to 120 seconds |
| Input 5 Burnout | 206 | 11 | 0 = None 1 = Upscale 2 = Downscale |
| Input 5 Emissivity | 097 | 18 | 0.01 to 1.00 |

7.10 Configuration Parameters - UDC 6000, Continued

Control and Control 2 Table 7-26 lists all the I.D. codes and ranges or selections for the function prompts in setup group “CONTROL OR CONTROL 2.” Loop 1 or 2 address selected in request message.

Table 7-26 Setup Group-Control and Control 2

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| PV Source | 196 | 11 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 5 = Input Algorithm 1 |
| Tuning Parameter Selection | 172 | 11 | 0 = One set only 1 = 2 sets keyboard selected 2 = 2 sets with PV automatic switchover 3 = 2 sets with setpoint automatic switchover |
| Automatic Switchover Value (used with 172 selection 2 or 3) | 056 | 18 | Within the PV Range in engineering units |
| Local Setpoint Source | 173 | 11 | 0 = One Local Setpoint 1 = Two Local Setpoints 3 = Three Local Setpoints |

7.10 Configuration Parameters - UDC 6000, Continued

Control and Control 2,
continued

Table 7-26 Setup Group-Control and Control 2, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Setpoint Source | 197 | 11 | 0 = Local Setpoint only 1 = Remote Setpoint via Input 2 2 = Remote Setpoint via Input 3 3 = Remote Setpoint via Input 4 4 = Remote Setpoint via Input 5 5 = Loop 1 Input Algorithm 6 = Loop 2 Input Algorithm |
| Auto-Bias (LSP to RSP) | 198 | 11 | 0 = Disabled (bump) 1 = Enabled (bumpless) |
| Setpoint Tracking | 138 | 11 | 0 = NO 1 = PV 2 = RSP |
| Control Setpoint High Limit | 007 | 18 | 0 to 100% of PV (engineering units) |
| Control Setpoint Low Limit | 008 | 18 | 0 to 100% of PV (engineering units) |
| Control Output Direction/Alarm Outputs | 135 | 11 | 0 = Direct Action Alarm Output energized 1 = Direct Action Alarm Output de-energized 2 = Reverse Action Alarm Output energized 3 = Reverse Action Alarm Output de-energized |
| High Output Limit | 014 | 18 | –5 to 105% of output |
| Low Output Limit | 015 | 18 | –5 to 105% of output |
| High Reset Limit | 016 | 18 | –5 to 105% of output |

7.10 Configuration Parameters - UDC 6000, Continued

Control and Control 2,
continued

Table 7-26 Setup Group-Control and Control 2, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Low Reset Limit | 017 | 18 | –5 to 105% of output |
| Output Rate | 182 | 11 | 0 = Disable 1 = Enable |
| Output Rate Value Up | 044 | 18 | 0 to 9999%/minute |
| Output Rate Value Down | 046 | 18 | 0 to 9999%/minute |
| Controller Dropoff Value | 020 | 18 | –5 to 105% of output |
| Output Deadband | 018 | 18 | –5 to +25.0% |
| Output Hysteresis (Loop 1 address only) | 019 | 18 | 0 to 5.0% |
| Failsafe Mode | 199 | 11 | 0 = Latching 1 = Non latching |
| Failsafe Output Level | 040 | 18 | 0 to 100% |
| Proportional Band Units (Loop 1 address only) applies to Loop 1 and 2 | 148 | 11 | 0 = Gain 1 = Proportional band |
| Reset Units (Loop 1 address only) applies to Loop 1 and 2 | 149 | 11 | 0 = Minutes 1 = RPM |

7.10 Configuration Parameters - UDC 6000, Continued

Options

Table 7-27 lists all the I.D. codes and ranges or selections for the function parameters in setup group “OPTIONS.” Loop 1 or 2 is selected in the request message.

Table 7-27 Setup Groups-Options

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| 2nd Current Output | 134 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = PV – Loop 1 4 = Deviation – Loop 1 5 = Output – Loop 1 6 = Setpoint – Loop 1 7 = Input 3 8 = PV – Loop 2 9 = Deviation – Loop 2 10 = Output – Loop 2 11 = Setpoint – Loop 2 12 = Input 4 13 = Input 5 |
| Low Scaling Factor (Loop 1 address only) | 049 | 18 | Within the range of the selected variable in I.D. 134 |
| High Scaling Factory (Loop 1 address only) | 050 | 18 | Within the range of the selected variable in I.D. 134 |

7.10 Configuration Parameters - UDC 6000, Continued

Options, continued

Table 7-27 Setup Groups-Options, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| Digital Input #1 (Loop 1 address only) | 155 | 11 | <p> 0 = None 1 = To Manual 2 = To Local Setpoint #1 3 = To Local Setpoint #2 4 = To Direct Action 5 = To Hold Ramp 6 = To PID Set #2 7 = PV = Input 2 8 = PV = Input 3 9 = To Run Ramp 10 = To Local Setpoint #3 11 = PV = Input 4 12 = PV = Input 5 13 = To Manual/ Failsafe Output 14 = Output 1 tracks Input 4 15 = Output 2 tracks Input 4 16 = Output 2 overrides Output 1 17 = Pulse Down 18 = Out 3 On 19 = Out 4 On 20 = Inhibit Reset 21 = To RSP 22 = Display – Loop 2 23 = External Reset Feedback </p> <p>For 0 through 255 loop selected by address in request message. For digital input combinations see Figure 7-3.</p> |

7.10 Configuration Parameters - UDC 6000, Continued

Options, continued

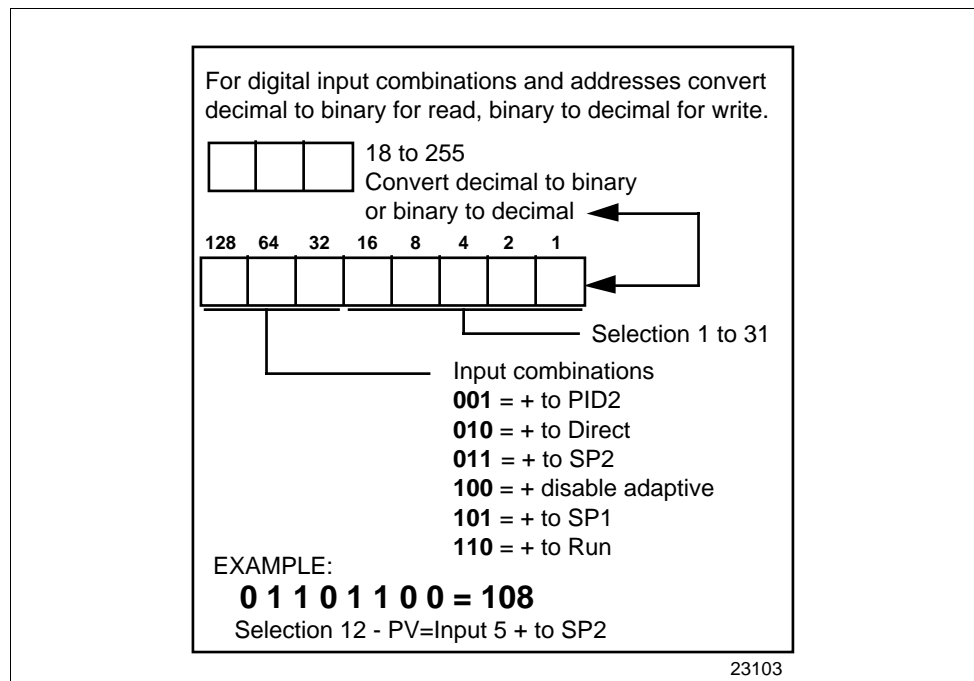
Table 7-27 Setup Groups-Options, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Digital Input #2 (Loop 1 address only) | 156 | 11 | 0 = None 1 = To Manual 2 = To Local Setpoint #1 3 = To Local Setpoint #2 4 = To Direct Action 5 = To Hold Ramp 6 = To PID Set #2 7 = PV = Input 2 8 = PV = Input 3 9 = To Run Ramp 10 = To Local Setpoint #3 11 = PV = Input 4 12 = PV = Input 5 13 = To Manual/ Failsafe Output 14 = Output 1 tracks Input 4 15 = Output 2 tracks Input 4 16 = Output 2 overrides Output 1 17 = Pulse Down 18 = Out 3 On 19 = Out 4 On 20 = Inhibit Reset 21 = To RSP 22 = Display – Loop 2 23 = External Reset Feedback Digital Input 2 combinations are the same as Digital Input 1, Figure 7-3. |

7.10 Configuration Parameters - UDC 6000, Continued

Options, continued

Figure 7-3 Digital Input Combinations



7.10 Configuration Parameters - UDC 6000, Continued

Communications

Table 7-28 lists all the I.D. codes and ranges or selections for the function parameters in setup group “COM.” Loop 1 or 2 is selected in the request message.

Table 7-28 Setup Group-Communications

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Shed Time (Loop 1 address only) | 154 | 11 | 0 = No Shed 1 = 255 sample periods |
| Shed Mode and Output (Loop 1 address only) Selections apply to either loop | 162 | 11 | 0 = Last Mode and Last Output 1 = Manual Mode, Last Output 2 = Manual Mode, Failsafe Output 3 = Automatic Mode |
| Shed Setpoint Recall (Loop 1 address only) Selections apply to either loop | 163 | 11 | 0 = To Last Local Setpoint used 1 = Last Setpoint prior to Shed |
| Communication Override Units (Loop 1 address only) applies to Loop 1 and 2 | 161 | 11 | 0 = Percent 1 = Engineering Units |
| Computer Setpoint Ratio | 021 | 18 | –20.00 to 20.00 |
| Computer Setpoint Bias | 022 | 18 | –999 to 9999. |

7.10 Configuration Parameters - UDC 6000, Continued

Alarms

Tables 7-29 lists all the I.D. codes and ranges or selections for the function parameters in setup group “ALARMS.”

Table 7-29 Setup Group-Alarms (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------|------------------|-------------|--|
| Alarm 1 Setpoint 1 Value | 009 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 1 Setpoint 2 Value | 010 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 2 Setpoint 1 Value | 011 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 2 Setpoint 2 Value | 012 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 1 Setpoint 1 Type | 140 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = PV – Loop 1 4 = Deviation – Loop 1 5 = Output – Loop 1 6 = Alarm on Shed 9 = Input 3 10 = PV – Loop 2 11 = Deviation – Loop 2 12 = Output – Loop 2 13 = Input 4 14 = Input 5 15 = Manual-Loop 1 16 = Manual-Loop 2 17 = RSP-Loop 1 18 = RSP-Loop 2 19 = Failsafe-Loop 1 20 = Failsafe-Loop 2 |
| Alarm 1 Setpoint 2 Type | 142 | 11 | Same as 140 |
| Alarm 2 Setpoint 1 Type | 144 | 11 | Same as 140 |
| Alarm 2 Setpoint 2 Type | 146 | 11 | Same as 140 |
| Alarm 1 Setpoint 1 Event | 141 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 1 Setpoint 2 Event | 143 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 2 Setpoint 1 Event | 145 | 11 | 0 = Low Alarm 1 = High Alarm |

7.10 Configuration Parameters - UDC 6000, Continued

Alarms, continued

Table 7-29 Setup Group-Alarms (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|--|
| Alarm 2 Setpoint 2 Event | 147 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm Hysteresis | 041 | 18 | 0.0 to 5.0% of output or span |
| Alarm Latching for Loop 1 | 200 | 11 | 0 = Non Latching 1 = Latching |
| Alarm Latching for Loop 2 | 201 | 11 | 0 = Non Latching 1 = Latching |

Display

Table 7-30 lists all the I.D. codes and ranges or selections for the function parameters in setup group “DISPLAY.” Loop 1 or 2 is selected by address in the request message.

Table 7-30 Setup Group-Display

| Parameter Description | Identifying Code | Format Code | Range or Selection | |
|---|------------------|-------------|------------------------------|----------------|
| Temperature Units and Decimal Point Place | 129 | 11 | Units | Decimal Places |
| | | | 0 = °F | 0 |
| | | | 1 = °C | 0 |
| | | | 2 = °F | 1 |
| | | | 3 = °C | 1 |
| | | | 4 = °F | 2 |
| | | | 5 = °C | 2 |
| | | | 6 = °F | 3 |
| | | | 7 = °C | 3 |
| | | | 8 = None | 0 |
| | | | 9 = None | 1 |
| | | | 10 = None | 2 |
| 11 = None | 3 | | | |
| Power Frequency (Loop 1 address only) | 166 | 11 | 0 = 60 Hertz 1 = 50 Hertz | |

Section 8 – Read, Write and Override Parameters on UDC 6300 Process Controllers

8.1 Overview

Introduction

This section contains information concerning Reading, Writing, and Overriding parameters on the UDC 6300 Process Controller. There are two types of parameters:

- Data Transfer—these parameters include reading control data, option status, and reading or changing setpoints or output.
- Configuration Data—all the configuration data is listed in the order in which it appears in the controller.

Each type of parameter has the identifying codes listed with it. Follow the message exchange rules listed in “Read and Write Operations.”

8.1 Overview - UDC 6300, Continued

What's in this section This section contains the following topics:

| Topic | | See Page |
|-------|---|----------|
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| 8.2 | Reading Control Data | 180 |
| 8.3 | Read Option Status | 181 |
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8.1 Overview - UDC 6300, Continued

General information

Analog Parameters

- Whenever analog parameters 001 through 114 (those that can be changed via communications) are changed, a Write cycle occurs immediately after receipt of the message.

Override Parameters

- Override analog parameters 120, 123 and 125 (PV, output, computer setpoint) are not stored in non-volatile memory and can be changed as frequently as desired with no effect on non-volatile memory retentivity, but controller must remain in slave mode.

Digital Parameters

- Whenever digital configuration parameters 128 through 250 are updated via communications, the non-volatile memory is updated as soon as the message is received.

8.2 Reading Control Data - UDC 6300

Overview

You can Read the following control data from the UDC controller.

- Input 1
- Input 2
- Input 3
- Input 4
- Input 5
- PV
- Internal RV
- PV, Setpoint, Output

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

I.D. codes

Use the identifying codes listed in Table 8-1 to read the specific items.

A Write request for these codes will result in an Error message.

Table 8-1 Control Data Parameters

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|------------------------------------|
| Input #1 | 118 | 18 | In Engineering Units or Percentage |
| Input #2 | 119 | 18 | In Engineering Units or Percentage |
| Input #3 | 117 | 18 | In Engineering Units or Percentage |
| Input #4 | 104 | 18 | In Engineering Units or Percentage |
| Input #5 | 105 | 18 | In Engineering Units or Percentage |
| PV | 120 | 18 | In Engineering Units or Percentage |
| Internal RV | 121 | 18 | In Engineering Units or Percentage |
| PV, Setpoint, and Output* | 122 | 18 | In Engineering Units or Percentage |

*This Read request will give a three variable response (see Read/Write operation).

8.3 Read Options Status - UDC 6300

Read

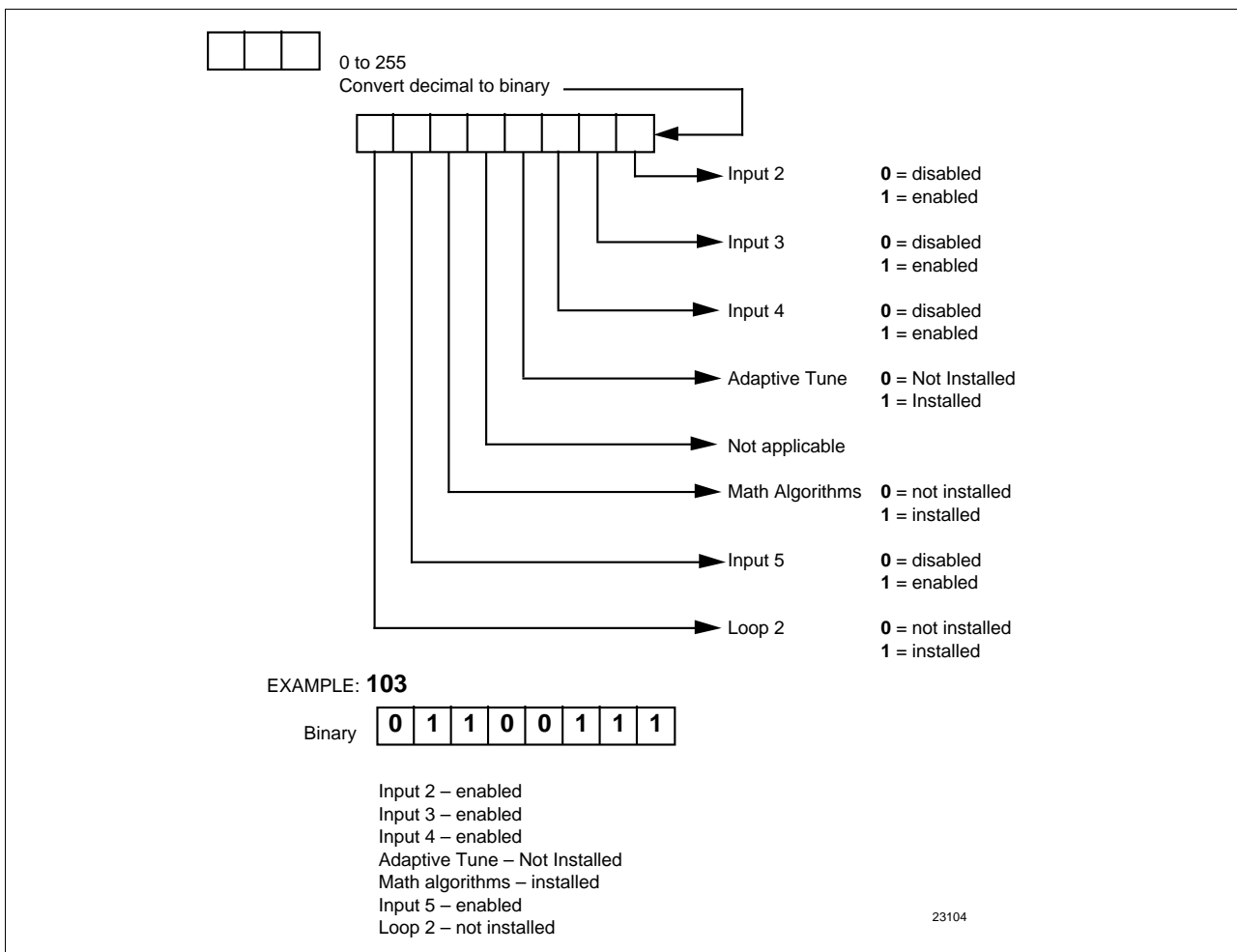
Doing a read of I.D. Code 185 listed in Table 8-2 will tell you which of the available options are enabled/installed or disabled/not installed.

Table 8-2 Option Status

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|--------------------|
| Option Status (Read only) | 185 | 11 | See Figure 8-1 |

The data field in the response message will be a decimal number from 0 to 255. Convert the decimal number to binary as shown in Figure 8-1 to determine which options are or are not active.

Figure 8-1 Option Status Information



8.4 Miscellaneous Read Only's - UDC 6300

I.D. codes for Read Only's

The identifying codes listed in Table 8-3 represent some information that are Read only. No Writes allowed.

Table 8-3 Miscellaneous Read Only's

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Software Type | 157 | 11 | READ only (UDC 6300) 81 = Basic UDC 6300 software 82 = Field upgrade for Adaptive Tune 83 = Field upgrade for Adaptive Tune + Math 84 = Field upgrade for Adaptive Tune + 2 Loop 85 = Field Upgrade for all options 86 = Indicator Version |
| Software Version | 167 | 11 | READ only 0 to 99 |
| Second Current Output Value | 48 | 18 | Engineering Units for selected type |
| Digital Input Switch Status (Read only) | 190 | 11 | The data field in the response message will be a hexadecimal number. Convert the HEX to binary as shown below to determine which Digital Input switches are closed. <div><div><div><div></div><div></div></div><div>Convert Hexidecimal to binary</div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>Digital Input #1</div><div>Digital Input #2</div><div>Digital Input #3</div><div>Digital Input #4</div><div>Digital Input #5</div><div>Digital Input #6</div><div>Not Applicable</div><div>Not Applicable</div></div><div><div>0 = Switch Open</div><div>1 = Switch Closed</div></div></div><div><div>EXAMPLE: 3C</div><div>Binary</div><div><div>0</div><div>0</div><div>1</div><div>1</div><div>1</div><div>1</div><div>0</div><div>0</div></div><div><div>D/I Switch #1 - Open</div><div>D/I Switch #2- Open</div><div>D/I Switch #3 - Closed</div><div>D/I Switch #4 - Closed</div><div>D/I Switch #5 - Closed</div><div>D/I Switch #6 - Closed</div></div></div><div>23105</div></div> |

8.4 Miscellaneous Read Only's - UDC 6300, Continued

.ID. codes for Read Only's, continued

Table 8-3 Miscellaneous Read Only's, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Alarm 1 and 2 Status | 189 | 11 | <div><p>The data field in the response message will be a hexadecimal number. Convert the HEX to binary as shown below to determine the state of Alarm #1 and Alarm #2.</p><div><div><div><div></div><div></div></div><div>Convert Hexidecimal to binary</div></div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>Alarm 1 Setpoint 1</div><div>Alarm 1 Setpoint 2</div><div>Alarm 2 Setpoint 1</div><div>Alarm 2 Setpoint 2</div><div>Alarm 1 Setpoint 1</div><div>Alarm 1 Setpoint 2</div><div>Alarm 2 Setpoint 1</div><div>Alarm 2 Setpoint 2</div></div><div><div>0 = No Alarm</div><div>1 = Alarm</div><div>0 = Low Alarm or Not Configured</div><div>1 = High Alarm</div></div></div><div>23106</div></div><div><p>EXAMPLE: 3C</p><div><div>Binary</div><div><div>0</div><div>0</div><div>1</div><div>1</div><div>1</div><div>1</div><div>0</div><div>0</div></div></div><div><div>Alarm 1 Setpoint 1 - No Alarm</div><div>Alarm 1 Setpoint 2 - No Alarm</div><div>Alarm 2 Setpoint 1 - Alarm</div><div>Alarm 2 Setpoint 2 - Alarm</div><div>Alarm 1 Setpoint 1 - High Alarm</div><div>Alarm 1 Setpoint 2 - High alarm</div><div>Alarm 2 Setpoint 1 - Low Alarm</div><div>Alarm 2 Setpoint 2 - Low Alarm</div></div></div></div></div> |

8.4 Miscellaneous Read Only's - UDC 6300, Continued

.ID. codes for Read Only's, continued

Table 8-3 Miscellaneous Read Only's, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| Alarm 3 and 4 Status | 191 | 11 | <p>The data field in the response message will be a hexadecimal number. Convert the HEX to binary as shown below to determine the state of Alarm #3 and Alarm #4.</p> <p>EXAMPLE: 3C</p> <p>Binary 0 0 1 1 1 1 0 0</p> <p>Alarm 3 Setpoint 1 - No Alarm Alarm 3 Setpoint 2 - No Alarm Alarm 4 Setpoint 1 - Alarm Alarm 4 Setpoint 2 - Alarm</p> <p>Alarm 3 Setpoint 1 - High Alarm Alarm 3 Setpoint 2 - High alarm Alarm 4 Setpoint 1 - Not Configured Alarm 4 Setpoint 2 - Not Configured</p> |

8.4 Miscellaneous Read Only's - UDC 6300, Continued

I.D. codes for Read Only's

Table 8-3 Miscellaneous Read Only's

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| UDC Error Status (Definitions are listed in Table 8-4) Loop 1 or 2 designated in the request message | 255 | 11 | See below READ/WRITE* 001 = Emergency Manual 002 = Failsafe 004 = Working Calibration Checksum Error 008 = Configuration Checksum Error 016 = Factory Calibration Error 032 = Hardware Failure 064 = Restart after Shed 128 = Configuration/Calibration Memory Changed |

* Write to clear.

For example:

If Read returns 192 (restart after shed-64 plus configuration change-128)

Write anything to I.D. Code 255

Read returns 000 (clear).

Error status definitions

Table 8-4 list the UDC error status codes and their definitions.

Table 8-4 Error Status Definitions

| Code | Error | Definitions |
|------|---|--|
| 001 | Emergency Manual | Indicates that the output of the unit, which has been in slave operations, is under manual control, locally. Error remains until local control is relinquished at the controller. |
| 002 | Failsafe | Error occurs whenever the control reverts to failsafe operation and remains as long as the condition exists. |
| 004 | Working Calibration Checksum Error | Indicates that an error exists in the working calibration data. Re-select the inputs to load factory calibration data or field calibrate the inputs. |
| 008 | Configuration Checksum Error | Error exists in the configuration data. Verify configuration data at the keyboard. Checksum will be recomputed by stepping the controller through the status tests. |
| 016 | Factory Calibration Error | Error exists in the factory calibration data and remains as long as the condition exists. |
| 032 | Hardware Failure | Indicates either a RAM tests failure or Input 1, Input 2, Input 3 failure on two consecutive conversions. |
| 064 | Restart After Shed | Error occurs whenever a shed of slave override is performed. Error is reset following a WRITE command to I.D. Code 255 (064). |
| 128 | Configuration /Calibration Memory Changed | Error occurs whenever shed, configuration, or calibration changed. Also occurs whenever there is a change of state in 001, 002, 004, 008, or 016. Error is reset following a Write command to I.D. Code 255. |

8.5 Setpoints - UDC 6300

Overview

You can use three separate local setpoints in the UDC Controller. The identifying codes listed Table 8-5 allow you to select which setpoint you want to use and to enter a value in Engineering Units or Percent (whichever is selected at Code 161) for that setpoint via communications.

I.D. codes

Make your selection using I.D. Code 173 and enter the value for the setpoint chosen using ID Code 39 (SP1) or 53 (SP2) or 113 (SP3).

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 8-5 Setpoint Code Selections

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Local Setpoint #1 | 039 | 18 | Value within the setpoint range limits |
| Local Setpoint #2 | 053 | 18 | Value within the setpoint range limits |
| Local Setpoint #3 | 113 | 18 | Value within the setpoint range limits |
| Local Setpoint Select | 173 | 11 | 000 = Local Setpoint #1 only 001 = 2nd Local Setpoint via keyboard or communications 003 = 3rd Local Setpoint via keyboard or communications |

Associated parameters

Refer to Table 8-6 to display or change any of the parameters associated with the setpoint.

Table 8-6 Setpoint Associated Parameters

| Parameter | Code |
|-------------------|----------|
| Setpoint Limits | 007, 008 |
| Computer Setpoint | 125 |

8.6 Using a Computer Setpoint(Overriding Controller Setpoint) - UDC 6300

Overview

You can use a setpoint generated from the computer to override the setpoint being used by the controller.

The value generated by the computer will have ratio and bias applied by the controller.

I.D. codes

Use the Identifying Code in Table 8-7 to enter the computer setpoint.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 8-7 Computer Setpoint Selection

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Computer Setpoint | 125 | 18 | Value from computer with Ratio/Bias applied by the controller. Within the Setpoint Range Limits in Engineering Units or Percent. |

Shed

The computer setpoint override will continue until "SHED" from communications occurs or the controller is placed into monitor mode through communications. Doing periodic "SLAVE READS" within the shed time will allow the override to continue until communication is stopped and shed time elapses.

ATTENTION 0 Shed (code 154) allows the override to continue indefinitely or until the override is canceled. (See override selection ID Code 183.)

When SP is overridden, the left most digit in the upper display becomes a "C."

8.6 Using a Computer Setpoint (Overriding Controller Setpoint), - UDC 6300, Continued

Associated parameters

Refer to Table 8-8 for the codes to display or change any of the parameters associated with the computer setpoint.

Table 8-8 Computer Setpoint Associated Parameters

| Parameter | Code |
|---------------------------------|----------|
| Setpoint Limits | 007, 008 |
| Local Setpoint #1 | 039 |
| Local Setpoint #2 | 053 |
| Local Setpoint #3 | 113 |
| Local Setpoint Selection | 173 |
| Loop #1 Computer Setpoint Ratio | 021 |
| Loop #1 Computer Setpoint Bias | 022 |

8.7 PV or Setpoint Override Selections - UDC 6300

Overview You can Read the present override status or the PV or setpoint or you can do a write transaction to cancel the override.

I.D. codes Use the Identifying Code in Table 8-9 to Read or Write your selection.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 8-9 PV or Setpoint Override Selections

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------------|------------------|-------------|--------------------------|
| PV or Setpoint Override Selection | 183 | 11 | 04 = PV 08 = Setpoint |

8.8 Reading or Changing the Output - UDC 6300

Overview You can read the output of a particular UDC controller (Read transaction) or you can change it to suit your needs. (Do a Write transaction.)

I.D. codes Use the identifying code in Table 8-10 to monitor (Read) or change (Write) the output (in manual only).

ATTENTION To Write (change) the output, the controller must first be in manual mode.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 8-10 Reading or Changing the Output

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Output | 123 | 18 | -5 to +105% of full span (current output) 0 to 100% (relay type output) |

Associated parameters Refer to Table 8-11 for the codes required to display or change any of the parameters associated with the output.

Table 8-11 Associated Output Codes

| Parameter | Code |
|------------------------|----------|
| Output Limits | 014, 015 |
| Output Dropoff Limits | 020 |
| Failsafe Output Values | 040 |
| Output Deadband | 018 |
| Output Hysteresis | 019 |
| Output Type | 160 |

8.9 Local Setpoint/PID Selection/Setpoint Ramp Status UDC 6300

Overview

Identifying Code 250 lets you

- Monitor your Setpoint Ramp Status
 - In Progress, Not in Progress
 - In Run, On Holdand determine which tuning set and local setpoint is being used.
- Abort, Run, Hold, or Start and SP Ramp.
- Select Local Setpoint #1, #2, or #3.
- Select Tuning Parameter Set #1 or #2.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Read

When you do a Read, the code in Table 8-12 determines which parameters are active:

- Local Setpoint Selection
- Tuning Parameter Set Selection
- Setpoint Ramp Status

Table 8-12 I.D. Code 250 Reads

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--------------------|
| Read Local Set Point PID Set Selection and SP Ramp Status | 250 | 11 | See Figure 8-2 |

8.9 Local Setpoint/PID Selection/Setpoint Ramp Status - UDC 6300, Continued

Read, continued

Figure 8-2 I.D. Code 250 Indications

| | | | | | | |
|---|-----|-----|-----|-----|-----|-----|
| Tuning Set #2 Selection Local Set Point #3 Selection | | | | | | |
| Tuning Set #1 Selection Local Set Point #3 Selection | | | | | | |
| Tuning Set #2 Selection Local Set Point #2 Selection | | | | | | |
| Tuning Set #2 Selection Local Set Point #1 Selection | | | | | | |
| Tuning Set #1 Selection Local Set Point #2 Selection | | | | | | |
| Tuning Set #1 Selection Local Set Point #1 Selection | | | | | | |
| SET POINT RAMP INFORMATION (Note 1) | | | | | | |
| SP Ramp, Enabled not in progress | 000 | 008 | 016 | 024 | 032 | 048 |
| SP Ramp in progress, Hold | 002 | 010 | 018 | 026 | 034 | 050 |
| SP Ramp in progress, Run | 003 | 011 | 019 | 027 | 035 | 051 |

NOTE 1: This data is ignored in a Write command. Run/Hold set by Communications or by the Run/Hold key.

8.9 Local Setpoint/PID Selection /Setpoint Ramp Status - UDC 6300, Continued

Write

A write of code 250 lets you change the SP ramp status as well as the local setpoint or tuning set selection. Refer to Table 8-13.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 8-13 I.D. Code 250 Writes

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Write Local Setpoint/PID Set Selection and SP Ramp Status | 250 | 11 | 000 = Abort SP Ramp 001 = Run SP Ramp 002 = Hold SP Ramp 003 = Start SP Ramp 004 = Change to Local Setpoint #1 005 = Change to Local Setpoint #2 006 = Change to PID Tuning Set #1 007 = Change to PID Tuning Set #2 008 = Change to Local Setpoint #3 |

ATTENTION

To enable or disable the setpoint ramp, refer to Identifying Code 150.

8.10 Configuration Parameters - UDC 6300

Overview

Listed on the next pages are the identifying codes for the parameters in the various Setup Groups in the UDC 6300 Process Controller. The table below lists the Setup Groups and their table numbers in which they are listed. Most of the parameters are configurable through the hosts. Some are Read Only and are indicated as such and cannot be changed.

| Setup Group | Table Number |
|-----------------------|--------------|
| TUNING | 8-14 |
| TUNING L2 | 8-15 |
| SP RAMP | 8-16 |
| ADAPTIVE | 8-17 |
| ALGORITHM | 8-18 |
| ADVANCED MATH | 8-19 |
| OUTPUT ALGORITHM | 8-20 |
| INPUT 1 | 8-21 |
| INPUT 2 | 8-22 |
| INPUT 3 | 8-23 |
| INPUT 4 | 8-24 |
| INPUT 5 | 8-25 |
| CONTROL AND CONTROL 2 | 8-26 |
| OPTIONS | 8-27 |
| COMMUNICATIONS | 8-28 |
| ALARMS | 8-29 |
| DISPLAY | 8-30 |

Reading or writing

Do a Read or Write (see “Read/Write Operations”), depending on your requirements using the identifying code and format code listed in the tables. The range or selection available for each range is listed in the tables.

8.10 Configuration Parameters - UDC 6300, Continued

Tuning

Table 8-14 lists all the I.D. codes and ranges or selections for the function parameters in the Setup Group “TUNING” (Loop 1).

Table 8-14 Setup Group-Tuning (Loop 1)*

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Gain #1 or PB | 001 | 18 | 0.01 to 1000 Gain 0.1 to 9999 PB |
| Rate #1 | 002 | 18 | 0.00 to 10.00 |
| Reset #1 | 003 | 18 | 0.02 to 50.00 |
| Manual Reset | 013 | 18 | -100 to +100 |
| Gain #2 or PB | 004 | 18 | 0.01 to 1000 |
| Rate #2 | 005 | 18 | 0.00 to 10.00 |
| Reset #2 | 006 | 18 | 0.02 to 50.00 |
| Cycle Time #1 | 158 | 11 | 1 to 120 seconds |
| Cycle Time #2 | 159 | 11 | 1 to 120 seconds |
| Lockout (keyboard only) Changes to data always possible via communications regardless of this configuration. | 132 | 11 | 0 = None 1 = Calibration + Configuration 2 = Max Lockout 3 = Calibration only 4 = Calibration + Configuration + View |
| PV1 Value gain scheduling | 001** | 48 | –9999 to 9999 |
| PV2 Value gain scheduling | 002** | 48 | –9999 to 9999 |
| PV3 Value gain scheduling | 003** | 48 | –9999 to 9999 |
| PV4 Value gain scheduling | 004** | 48 | –9999 to 9999 |
| PV5 Value gain scheduling | 005** | 48 | –9999 to 9999 |
| PV6 Value gain scheduling | 006** | 48 | –9999 to 9999 |
| PV7 Value gain scheduling | 007** | 48 | –9999 to 9999 |

8.10 Configuration Parameters - UDC 6300, Continued

Tuning, continued

Table 8-14 Setup Group-Tuning (Loop 1)*, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------|------------------|-------------|--------------------|
| PV8 Value gain scheduling | 008** | 48 | –9999 to 9999 |
| Gain 1 value gain scheduling | 009** | 48 | 0.001 to 1000 |
| Gain 2 value gain scheduling | 010** | 48 | 0.001 to 1000 |
| Gain 3 value gain scheduling | 011** | 48 | 0.001 to 1000 |
| Gain 4 value gain scheduling | 012** | 48 | 0.001 to 1000 |
| Gain 5 value gain scheduling | 013** | 48 | 0.001 to 1000 |
| Gain 6 value gain scheduling | 014** | 48 | 0.001 to 1000 |
| Gain 7 value gain scheduling | 015** | 48 | 0.001 to 1000 |
| Gain 8 value gain scheduling | 016** | 48 | 0.001 to 1000 |

*Loop selected by address in request message.

**Extended Codes—Use Format Code 48.

8.10 Configuration Parameters - UDC 6300, Continued

Tuning 2

Table 8-15 lists all the I.D. codes and ranges or selections for the function parameters in the Setup Group “TUNING 2.”

Table 8-15 Setup Group-Tuning 2* (Loop 2)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------|------------------|-------------|------------------------------------|
| Gain #3 or PB | 001 | 18 | 0.1 to 1000 Gain 0.1 to 9999 PB |
| Rate #3 | 002 | 18 | 0.00 to 10.00 |
| Reset #3 | 003 | 18 | 0.02 to 50.00 |
| Man Reset3 | 013 | 18 | –100 to +100 |
| Gain #4 or PB | 004 | 18 | 0.1 to 1000 |
| Rate #4 | 005 | 18 | 0.00 to 10.00 |
| Reset #4 | 006 | 18 | 0.02 to 50.00 |
| Cycle Time #3 | 158 | 11 | 1 to 120 seconds |
| Cycle Time #4 | 159 | 11 | 1 to 120 seconds |
| PV1 Value gain scheduling | 001** | 48 | –9999 to 9999 |
| PV2 Value gain scheduling | 002** | 48 | –9999 to 9999 |
| PV3 Value gain scheduling | 003** | 48 | –9999 to 9999 |
| PV4 Value gain scheduling | 004** | 48 | –9999 to 9999 |
| PV5 Value gain scheduling | 005** | 48 | –9999 to 9999 |
| PV6 Value gain scheduling | 006** | 48 | –9999 to 9999 |
| PV7 Value gain scheduling | 007** | 48 | –9999 to 9999 |
| PV8 Value gain scheduling | 008** | 48 | –9999 to 9999 |
| Gain 1 value gain scheduling | 009** | 48 | 0.001 to 1000 |

**Extended Codes—Use Format Code 48.

8.10 Configuration Parameters - UDC 6300, Continued

Tuning 2, continued

Table 8-15 Setup Group-Tuning 2* (Loop 2), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------|------------------|-------------|--------------------|
| Gain 2 value gain scheduling | 010** | 48 | 0.001 to 1000 |
| Gain 3 value gain scheduling | 011** | 48 | 0.001 to 1000 |
| Gain 4 value gain scheduling | 012** | 48 | 0.001 to 1000 |
| Gain 5 value gain scheduling | 013** | 48 | 0.001 to 1000 |
| Gain 6 value gain scheduling | 014** | 48 | 0.001 to 1000 |
| Gain 7 value gain scheduling | 015** | 48 | 0.001 to 1000 |
| Gain 8 value gain scheduling | 016** | 48 | 0.001 to 1000 |

*Loop selected by address in request message.

**Extended Codes—Use Format Code 48.

8.10 Configuration Parameters - UDC 6300, Continued

SP ramp/rate

Table 8-16 lists all the I.D. codes and ranges or selections for the function parameters in setup group “SP RAMP/RATE.” Loop 1 or 2 selected by address in request message.

Table 8-16 Setup Group-Setpoint Ramp/Rate

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Setpoint Ramp Enable NOTE: Cannot be enabled if Setpoint Rate is enabled. | 150 | 11 | 0 = OFF 2 = SP Ramp enabled – Loop 1 3 = SP Ramp enabled – Loop 2 4 = SP Ramp enabled – both loops |
| Single SP Ramp Time | 174 | 11 | 0 to 255 (minutes) applies to whichever loop has SP Ramp configured |
| Final Ramp SP Value | 026 | 18 | PV Range in engineering units |
| Setpoint Rate Enable NOTE: Cannot be enabled if Setpoint Ramp is enabled. | 180 | 11 | 0 = OFF 1 = SP Rate enabled – Loop 1 2 = SP Rate enabled – Loop 2 3 = SP Rate enabled – both loops |
| SP Rate Up Value (EU/HR) | 088 | 18 | 0 to 9999 |
| SP Rate Down Value (EU/HR) | 089 | 18 | 0 to 9999 |

8.10 Configuration Parameters - UDC 6300, Continued

Accutune

Table 8-17 lists all the I.D. codes and ranges or selections for the function parameters in setup group “ACCUTUNE.” Loop 1 or 2 is selected by address in request message.

Table 8-17 Setup Group-Adaptive Tune

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------|------------------|-------------|---|
| Fuzzy Overshoot Suppression | 225 | 11 | 0 = Disabled 1 = Enable Loop 1 2 = Enable Loop 2 3 = Enable Loops 1 and 2 |
| Accutune Enable – Loop 1 | 152 | 11 | 0 = Disabled 7 = SP Tune 8 = SP + PV Tune 9 = SP Tune FAST 10 = SP+PV Tune FAST 11 = Tune 12 = Tune + PV |
| Accutune Enable – Loop 2 | 152 | 11 | 0 = Disabled 1 = SP Tune 2 = SP + PV Tune 3 = SP Tune FAST 4 = SP+PV Tune FAST 5 = Tune 6 = Tune + PV |
| Setpoint Change | 153 | 11 | 5 to 15% span |
| Process Gain (KPG) | 114 | 18 | 0.01 to 50.0 |
| Accutune Error (Read only) | 151 | 11 | 0 = None 1 = Output less than or greater than Output Limits 2 = Output greater or less than Heat/Cool Limits 3 = Not applicable 4 = PV change not sufficient 5 = Process Identification failed 6 = Calculated Reset outside Reset Limits 7 = Calculated Gain outside Gain Limits 8 = Accutune aborted on command 9 = Input 1 error detected 10 = Accutune illegal during Ramp 11 = Accutune aborted when external switch detected. |

8.10 Configuration Parameters - UDC 6300, Continued

Algorithm

Table 8-18 lists all the I.D. codes and ranges or selections for the Function Parameters in setup group “ALGORITHM.” Loop 1 or 2 is selected in the request message.

Table 8-18 Setup Group-Algorithm

| Parameter Description | Identifying Code | Format Code | Range or Selection | | | | | | | | | | | | | | | |
|--|------------------|-------------|--|--|--------|--------|-----|-----|----------|-----|----|----------|-----|----|----|-----|----|----|
| Loop Rate (conversion/ second) (on Loop 1 address only) | 192 | 11 | <table><tr><th></th><th>Loop 1</th><th>Loop 2</th></tr><tr><td>0 =</td><td>12x</td><td>disabled</td></tr><tr><td>1 =</td><td>9x</td><td>disabled</td></tr><tr><td>2 =</td><td>6x</td><td>3x</td></tr><tr><td>3 =</td><td>3x</td><td>3x</td></tr></table> | | Loop 1 | Loop 2 | 0 = | 12x | disabled | 1 = | 9x | disabled | 2 = | 6x | 3x | 3 = | 3x | 3x |
| | Loop 1 | Loop 2 | | | | | | | | | | | | | | | | |
| 0 = | 12x | disabled | | | | | | | | | | | | | | | | |
| 1 = | 9x | disabled | | | | | | | | | | | | | | | | |
| 2 = | 6x | 3x | | | | | | | | | | | | | | | | |
| 3 = | 3x | 3x | | | | | | | | | | | | | | | | |
| Control Algorithm Selection †Not available for Loop 2 | 128 | 11 | 0 = ON/OFF† 1 = PID-A 2 = PID-B 3 = PD-A with Manual Reset 4 = Three Position Step† | | | | | | | | | | | | | | | |
| 3 Position Step Motor Time | 25 | 18 | 5.0 to 255.0 seconds | | | | | | | | | | | | | | | |
| Loop 2 Selection (Loop 2 address only) | 168 | 11 | 0 = Loop 1 only 1 = Loop 2 enabled 2 = Loop 1 and 2 are cascaded. Loop 2 primary – Loop 1 secondary. | | | | | | | | | | | | | | | |
| Output Override Hi or Lo Select (on Loop 2 address only – Loop 1 Output in Auto) | 136 | 11 | 0 = Disabled 1 = Hi Select 2 = Lo Select | | | | | | | | | | | | | | | |

8.10 Configuration Parameters - UDC 6300, Continued

Algorithm, continued Table 8-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------------------|-------------|--|
| Input Algorithm 1 †Input source selected via ID 193, 194, 195. | 131 (Loop 1 or 2) | 11 | 0 = None 3 = Weighted Average† 8 = Feed forward† 13 = Multiplier Divider† 14 = Multiplier† 15 = Multiplier Divider† 16 = Multiplier† 17 = Summer (with Ratio and Bias)† 18 = Input Hi Select (with Ratio and Bias)† 19 = Input Lo Select (with Ratio and Bias)† 25 = Feedforward/ Multiplier |
| Input Algorithm 2 †Input source selected via ID 164, 165, 188. | 137 (Loop 1) 131 (Loop 2) | 11 | 0 = None 3 = Weighted Average† 8 = Feed forward Summert† 13 = Multiplier Divider† 14 = Multiplier† 15 = Multiplier Divider† 16 = Multiplier† 17 = Summer (with Ratio and Bias)† 18 = Input Hi Select (with Ratio and Bias)† 19 = Input Lo Select (with Ratio and Bias)† 25 = Feedforward/ Multiplier |
| Constant K for Math Algorithm 1 | 045 | 18 | 0.001 to 1000 |
| Calc High (for Input Algorithm 1) | 054 | 18 | –999.0 to +9999 in Engineering Units |
| Calc Low (for Input Algorithm 1) | 055 | 18 | –999.0 to +9999 in Engineering Units |
| Constant K for Math Algorithm 2 | 047 | 18 | 0.001 to 1000 |
| Calc High (for Input Algorithm 2) | 051 | 18 | –999.0 to +9999 in Engineering Units |
| Calc Low (for Input Algorithm 2) | 052 | 18 | –999.0 to +9999 in Engineering Units |

8.10 Configuration Parameters - UDC 6300, Continued

Algorithm, continued Table 8-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| Input Algorithm 1 Input A Selection (used with ID 131 math calculations) | 193 | 11 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 5 = Other Algorithm 6 = Output 1 7 = Output 2 |
| Input Algorithm 1 Input B Selection (used with ID 131 math calculations) | 194 | 11 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 5 = Other Algorithm 6 = Output 1 7 = Output 2 |
| Input Algorithm 1 Input C Selection (used with ID 131 math calculations) | 195 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = Input 3 4 = Input 4 5 = Input 5 6 = Other Algorithm |
| Input Algorithm 2 Input A Selection (used with ID 137 math calculations) | 164 | 11 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 5 = Other Algorithm 6 = Output 1 7 = Output 2 |
| Input Algorithm 2 Input B Selection (used with ID 137 math calculations) | 165 | 11 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 5 = Other Algorithm 6 = Output 1 7 = Output 2 |
| Input Algorithm 2 Input C Selection (used with 137 math calculations) | 188 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = Input 3 4 = Input 4 5 = Input 5 6 = Other Algorithm |

8.10 Configuration Parameters - UDC 6300, Continued

Algorithm, continued Table 8-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| 8-segment Characterizer | 179 | 11 | 0 = Disable 1 = Input 2 2 = Loop 1 – Output 3 = Loop 2 – Output 4 = Input 4 |
| X0 Input to 8-segment characterizer | 059 | 18 | 0 to 99.99 |
| X1 Input | 060 | 18 | 0 to 99.99 |
| X2 Input | 061 | 18 | 0 to 99.99 |
| X3 Input | 062 | 18 | 0 to 99.99 |
| X4 Input | 063 | 18 | 0 to 99.99 |
| X5 Input | 064 | 18 | 0 to 99.99 |
| X6 Input | 065 | 18 | 0 to 99.99 |
| X7 Input | 066 | 18 | 0 to 99.99 |
| X8 Input | 067 | 18 | 0 to 99.99 |
| Y0 Output from 8-segment Characterizer | 068 | 18 | 0 to 99.99 |
| Y1 Output | 069 | 18 | 0 to 99.99 |
| Y2 Output | 070 | 18 | 0 to 99.99 |
| Y3 Output | 071 | 18 | 0 to 99.99 |
| Y4 Output | 072 | 18 | 0 to 99.99 |
| Y5 Output | 073 | 18 | 0 to 99.99 |
| Y6 Output | 074 | 18 | 0 to 99.99 |
| Y7 Output | 075 | 18 | 0 to 99.99 |
| Y8 Output | 076 | 18 | 0 to 99.99 |

8.10 Configuration Parameters - UDC 6300, Continued

Algorithm, continued Table 8-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| 8-segment Characterizer 2 | 159** | 41 | 0 = Disable 1 = Input 2 2 = Loop 1 – Output 3 = Loop 2 – Output 4 = Input 4 |
| X0 Input to 8-segment Characterizer 2 | 026*** | 48 | 0 to 99.99 |
| X1 Input (Char.2) | 027*** | 48 | 0 to 99.99 |
| X2 Input (Char.2) | 028*** | 48 | 0 to 99.99 |
| X3 Input (Char.2) | 029*** | 48 | 0 to 99.99 |
| X4 Input (Char.2) | 030*** | 48 | 0 to 99.99 |
| X5 Input (Char.2) | 031*** | 48 | 0 to 99.99 |
| X6 Input (Char.2) | 032*** | 48 | 0 to 99.99 |
| X7 Input (Char.2) | 033*** | 48 | 0 to 99.99 |
| X8 Input (Char.2) | 034*** | 48 | 0 to 99.99 |
| Y0 Output from 8-segment Characterizer2 | 035*** | 48 | 0 to 99.99 |
| Y1 Output (Char.2) | 036*** | 48 | 0 to 99.99 |
| Y2 Output (Char.2) | 037*** | 48 | 0 to 99.99 |
| Y3 Output (Char.2) | 038*** | 48 | 0 to 99.99 |
| Y4 Output (Char.2) | 039*** | 48 | 0 to 99.99 |
| Y5 Output (Char.2) | 040*** | 48 | 0 to 99.99 |
| Y6 Output (Char.2) | 041*** | 48 | 0 to 99.99 |
| Y7 Output (Char.2) | 042*** | 48 | 0 to 99.99 |
| Y8 Output (Char.2) | 043*** | 48 | 0 to 99.99 |

**Extended Codes - Use Format Code 41

***Extended Codes - Use Format Code 48

8.10 Configuration Parameters - UDC 6300, Continued

Algorithm, continued Table 8-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Polynomial | 181 | 11 | 0 = Disable 1 = Input 1 2 = Input 2 3 = Input 3 4 = Input 4 5 = Input 5 |
| C0 – Polynomial Coefficient | 081 | 18 | –99.99 to 99.99 |
| C1 – Coefficient | 082 | 18 | –9.999 to 9.999 |
| C2 – Coefficient | 083 | 18 | –9.999 to 9.999 |
| C3 – Coefficient | 084 | 18 | –9.999 to 9.999 |
| C4 – Coefficient | 085 | 18 | –9.999 to 9.999 |
| C5 – Coefficient | 086 | 18 | –9.999 to 9.999 |
| Totalizer | 184 | 11 | 0 = Disable 1 = Input 1 2 = Input Algorithm 1 3 = Input Algorithm 2 |
| Totalizer Scale Factor (display only) | 175 | 11 | 0 = $10^0 = 1$ 1 = $10^1 = 10$ 2 = $10^2 = 100$ 3 = $10^3 = 1,000$ 4 = $10^4 = 10,000$ 5 = $10^5 = 100,000$ 6 = $10^6 = 1,000,000$ |
| Totalizer Reset Lock (when locked, totalizer cannot be reset from keyboard) | 176 | 11 | 0 = Unlock 1 = Lock |
| Current Totalizer Value | 103 | 11 | 0 to $10^{14}-1$ NOTE: A value of “0” may be written to reset the totalizer. A write of any other value is not accepted. |
| Totalizer Integration Rate | 177 | 11 | 0 = Second 1 = Minute 2 = Hour 3 = Day 4 = Million/Day |

8.10 Configuration Parameters - UDC 6300, Continued

Advanced math

Table 8-19 lists all the I.D. codes and ranges and selections for the function parameters in setup group “ADVANCED MATH.” Loop 1 or 2 is selected request message.

Table 8-19 Setup Group-Advanced Math

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Logic Gates | 128** | 41 | 0 = Disable 1 = Enable |
| Gate 1 Type | 129** | 41 | 0 = Not Used 1 = OR 2 = NOR 3 = AND 4 = NAND 5 = XOR 6 = XNOR 7 = BLTA 8 = BGTA |
| Gate 1 Input A (for gate types 1 through 6) | 130** | 41 | 0 = Digital Input 1 1 = Digital Input 2 2 = Digital Output 1 3 = Digital Output 2 4 = Digital Output 3 5 = Digital Output 4 6 = Output from gate 1 7 = Output from gate 2 8 = Output from gate 3 9 = Output from gate 4 10 = Output from gate 5 11 = Fixed on – always “1” 12 = Fixed off – always “0” 13 = Manual/Auto mode (Loop 1) 14 = Local/Remote SP (Loop 1) 15 = Disable/Enable Adaptive Tune (Loop 1) 16 = Manual/Auto Mode (Loop 2 only) 17 = Local/Remote SP (Loop 2 only) 18 = Disable/Enable Adaptive Tune (Loop 2 only) |

**Extended Code—Use Format Code 41.

8.10 Configuration Parameters - UDC 6300, Continued

Advanced math,
continued

Table 8-19 Setup Group-Advanced Math, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Gate 1 Input A (for gate type 7 or 8) | 131** | 41 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 5 = Loop 1 PV 6 = Loop 1 SP 7 = Constant K 8 = Loop 2 PV (Loop 2 address only) 9 = Loop 2 SP (Loop 2 address only) |
| Gate 1 Input A "K" Value (appears only if selection 7 – Constant K is made at ID Code 131) | 017*** | 48 | –999.0 to 9999 |
| Gate 1 Input B (for gate types 1 through 6) | 132** | 41 | Same as 130 |
| Gate 1 Input B (for gate type 7 or 8) | 133** | 41 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 5 = Loop 1 PV 6 = Loop 1 SP 7 = Totalizer 8 = Loop 2 PV (Loop 2 address only) 9 = Loop 2 SP (Loop 2 address only) |

**Extended Code—Use Format Code 41.

***Extended Codes—Use Format Code 48.

8.10 Configuration Parameters - UDC 6300, Continued

Advanced math,
continued

Table 8-19 Setup Group-Advanced Math, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Gate 1 Output | 134** | 41 | 0 = Digital Output 1 1 = Digital Output 2 2 = Digital Output 3 3 = Digital Output 4 4 = Any Gate 5 = Manual/Auto Mode 6 = Local/Remote SP 7 = Disable/Enable Adaptive 8 = Reset Totalizer 9 = Manual/Auto Mode (Loop 2 address only) 10 = Local/Remote SP (Loop 2 address only) 11 = Disable/Enable Adaptive Tune (Loop 2 address only) |
| Gate 2 Type | 135** | 41 | Same as 129 |
| Gate 2 Input A (for gate types 1 through 6) | 136** | 41 | Same as 130 |
| Gate 2 Input A (for gate type 7 or 8) | 137** | 41 | Same as 131 |
| Gate 2 Input A “K” Value (appears only if selection 7 – Constant K is made at ID code 137) | 018*** | 48 | –999.0 to 9999 |
| Gate 2 Input B (for gate types 1 through 6) | 138** | 41 | Same as 130 |
| Gate 2 Input B (for gate type 7 or 8) | 139** | 41 | Same as 133 |
| Gate 2 Output | 140** | 41 | Same as 134 |
| Gate 3 Type | 141** | 41 | Same as 129 |

**Extended Code—Use Format Code 41.

***Extended Codes—Use Format Code 48.

8.10 Configuration Parameters - UDC 6300, Continued

Advanced math,
continued

Table 8-19 Setup Group-Advanced Math, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--------------------|
| Gate 3 Input A (for gate types 1 through 6) | 142** | 41 | Same as 130 |
| Gate 3 Input A (for gate type 7 or 8) | 143** | 41 | Same as 131 |
| Gate 3 Input A "K" Value (appears only if selection 7 – Constant K is made at ID code 143) | 019*** | 48 | –999.0 to 9999 |
| Gate 3 Input B (for gate types 1 through 6) | 144** | 41 | Same as 130 |
| Gate 3 Input B (for gate type 7 or 8) | 145** | 41 | Same as 133 |
| Gate 3 Output | 146** | 41 | Same as 134 |
| Gate 4 Type | 147** | 41 | Same as 129 |
| Gate 4 Type A (for gate types 1 through 6) | 148** | 41 | Same as 130 |
| Gate 4 Input A (for gate type 7 or 8) | 149** | 41 | Same as 131 |
| Gate 4 Input A "K" Value (appears only if selection 7 – Constant K is made at ID code 149) | 020*** | 48 | –999.0 to 9999 |
| Gate 4 Input B (for gate types 1 through 6) | 150** | 41 | Same as 130 |
| Gate 4 Input B (for gate type 7 or 8) | 151** | 41 | Same as 133 |
| Gate 4 Output | 152** | 41 | Same as 134 |
| Gate 5 Type | 153** | 41 | Same as 129 |

**Extended Code—Use Format Code 41.

***Extended Codes—Use Format Code 48.

8.10 Configuration Parameters - UDC 6300, Continued

Advanced math,
continued

Table 8-19 Setup Group-Advanced Math, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--------------------|
| Gate 5 Input A (for gate types 1 through 6) | 154** | 41 | Same as 130 |
| Gate 5 Input A (for gate type 7 or 8) | 155** | 41 | Same as 131 |
| Gate 5 Input A "K" Value (appears only if selection 7 – Constant K is made at ID code 151) | 021*** | 48 | –999.0 to 9999 |
| Gate 5 Input B (for gate types 1 through 6) | 156** | 41 | Same as 130 |
| Gate 5 Input B (for gate type 7 or 8) | 157** | 41 | Same as 133 |
| Gate 5 Output | 158** | 41 | Same as 134 |

**Extended Code—Use Format Code 41.

***Extended Codes—Use Format Code 48.

8.10 Configuration Parameters - UDC 6300, Continued

Output algorithm

Table 8-20 lists all the I.D. codes and ranges or selections for the function parameters in setup group “OUTPUT ALGORITHM.” Loop 1 or 2 is selected in the request message.

Table 8-20 Setup Group-Output Algorithm

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Output Algorithm | 160 | 11 | 0 = None (Loop 1) – Disabled (Loop 2) 1 = 3 Position Step 2 = Relay Simplex 3 = Relay Duplex (Loop 1 only) 4 = Current Simplex 5 = Current Duplex 6 = Relay/Current Duplex (Relay on Heat/Current Full) 7 = Current/Relay Duplex (Relay on Cool/Current Full) 8 = Current Duplex - Loop 1 only (Current Output - Cool, 2nd Current Output - Heat) 9 = Relay/Current Duplex - Loop 1 only (Relay on Heat/Current Split) 10 - Relay/Current Duplex - Loop 1 only (Relay on Cool/Current Split) |
| Digital Output State at 0% Output (on Loop 1 address only) | 136 | 11 | 0 = Out 3 de-energized Out 4 de-energized 1 = Out 3 energized Out 4 de-energized 2 = Out 3 de-energized Out 4 energized 3 = Out 3 energized Out 4 energized |

8.10 Configuration Parameters - UDC 6300, Continued

Input 1

Table 8-21 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 1.”

Table 8-21 Setup Group-Input 1 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 1 Type | 168 | 11 | 0 = OFF 27 = Linear NOTE: If 0 is received as a write, the input is disabled and the transmitter selection is lost. Whenever 27 is received as a write, if the input was previous disabled, the transmitter selection is set to linear with a range indeterminate; however, if the input was previously enabled, the transmitter type is unchanged. |
| Input 1 Transmitter Characterization | 169 | 11 | 0 = B T/C 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 11 = Nicrosil-Nisil T/C 12 = 100 Pt RTD 19 = Linear 20 = Sq. Root 27 = 100 Pt RTD Low 28 = 200 Pt RTD 29 = 500 Pt RTD |
| Input 1 High Range Value | 029 | 18 | –999. to 9999. Engineering Units |
| Input 1 Low Range Value | 030 | 18 | –999 to 9999. Engineering Units |
| Input 1 Ratio | 106 | 18 | –20.00 to 20.00 |
| Input 1 Bias | 107 | 18 | –999 to 9999. Engineering Units |
| Input 1 Filter | 042 | 18 | 0 to 120 seconds |
| Input Filtering | 133 | 11 | 0 = None(set IN1 and IN2 filter to 0) 1 = Input 1 (set IN2 filter to) 2 = Input 2 (set IN1 filter to) 3 = Filter both IN 1 and IN 2 |

8.10 Configuration Parameters - UDC 6300, Continued

Input 2

Table 8-22 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 2.”

Table 8-22 Setup Group-Input 2 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 2 Type | 170 | 11 | 0 = OFF 27 = Linear NOTE: If 0 is received as a write, the input is disabled and the transmitter selection is lost. Whenever 27 is received as a write, if the input was previous disabled, the transmitter selection is set to linear with a range indeterminate; however, if the input was previously enabled, the transmitter type is unchanged. |
| Input 2 Transmitter Characterization | 171 | 11 | 0 = B T/C 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 11 = Microsil-Nisil T/C 12 = 100 Pt RTD 19 = Linear 20 = Sq. Root 27 = 100 Pt RTD Low 28 = 200 Pt RTD 29 = 500 Pt RTD |
| Input 2 High Range Value | 035 | 18 | –999. to 9999. Engineering Units |
| Input 2 Low Range Value | 036 | 18 | –999 to 9999. Engineering Units |
| Input 2 Ratio | 037 | 18 | –20.00 to 20.00 |
| Input 2 Bias | 038 | 18 | –999 to 9999. Engineering Units |
| Input 2 Filter | 043 | 18 | 0 to 120 seconds |

8.10 Configuration Parameters - UDC 6300, Continued

Input 3

Table 8-23 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 3.”

Table 8-23 Setup Group-Input 3 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 3 Type | 186 | 11 | 0 = OFF 27 = Linear NOTE: If 0 is received as a write, the input is disabled and the transmitter selection is lost. Whenever 27 is received as a write, if the input was previous disabled, the transmitter selection is set to linear with a range indeterminate; however, if the input was previously enabled, the transmitter type is unchanged. |
| Input 3 Transmitter Characterization | 187 | 11 | 0 = B T/C 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 11 = Nicrosil-Nisil T/C 12 = 100 Pt RTD 19 = Linear 20 = Sq. Root 27 = 100 Pt RTD Low 28 = 200 Pt RTD 29 = 500 Pt RTD |
| Input 3 High Range Value | 108 | 18 | –999. to 9999. engineering units |
| Input 3 Low Range Value | 109 | 18 | –999 to 9999. engineering units |
| Input 3 Ratio | 110 | 18 | –20.00 to 20.00 |
| Input 3 Bias | 111 | 18 | –999 to 9999. engineering units |
| Input 3 Filter | 112 | 18 | 0 to 120 seconds |
| Input 3 Deadtime | 98 | 18 | 0.0 to 60.0 minutes |

8.10 Configuration Parameters - UDC 6300, Continued

Input 4

Table 8-24 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 4.”

Table 8-24 Setup Group-Input 4 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 4 Type | 202 | 11 | 0 = OFF 27 = Linear NOTE: If 0 is received as a write, the input is disabled and the transmitter selection is lost. Whenever 27 is received as a write, if the input was previous disabled, the transmitter selection is set to linear with a range indeterminate; however, if the input was previously enabled, the transmitter type is unchanged. |
| Input 4 Transmitter Characterization | 203 | 11 | 0 = B T/C 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 11 = Nicrosil-Nisil T/C 12 = 100 Pt RTD 19 = Linear 20 = Sq. Root 27 = 100 Pt RTD Low 28 = 200 Pt RTD 29 = 500 Pt RTD |
| Input 4 High Range Value | 087 | 18 | –999. to 9999. engineering units |
| Input 4 Low Range Value | 088 | 18 | –999 to 9999. engineering units |
| Input 4 Ratio | 089 | 18 | –20.00 to 20.00 |
| Input 4 Bias | 090 | 18 | –999 to 9999. engineering units |
| Input 4 Filter | 091 | 18 | 0 to 120 seconds |

8.10 Configuration Parameters - UDC 6300, Continued

Input 5

Table 8-25 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 5.”

Table 8-25 Setup Group-Input 5 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Input 5 Type | 204 | 11 | 0 = OFF 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 9 = B T/C 11 = Microsil Nisil T/C 12 = 100 Pt RTD 14 = 200 Pt RTD 15 = 500 Pt RTD 19 = Radiamatic 22 = 4-20 mA 23 = 0-10 mV 24 = 10-50 mV 25 = 1 to 5 volts 26 = 0 to 10 volts 36 = 100 Pt RTD Low 37 = Pulse (only when pulse input board is installed) |
| Input 5 Type (when pulse input is installed – i.e. 37 above) | 207 | 11 | 0 = Disabled 1 = Frequency Input 2 = Pulse Input |

8.10 Configuration Parameters - UDC 6300, Continued

Input 5, continued

Table 8-25 Setup Group-Input 5 (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 5 Transmitter Characterization | 205 | 11 | 0 = B T/C 1 = E T/C 2 = J T/C 3 = K T/C 4 = NiNiMo T/C 5 = R T/C 6 = S T/C 7 = T T/C 8 = W T/C 11 = Nicrosil-Nisil T/C 12 = 100 Pt RTD 19 = Linear 20 = Sq. Root 27 = 100 Pt RTD Low 28 = 200 Pt RTD 29 = 500 Pt RTD |
| Input 5 High Range Value | 092 | 18 | –999. to 9999. engineering units |
| Input 5 Low Range Value | 093 | 18 | –999 to 9999. engineering units |
| Input 5 Ratio | 094 | 18 | –20.00 to 20.00 |
| Input 5 Bias | 095 | 18 | –999 to 9999. engineering units |
| Input 5 Filter | 096 | 18 | 0 to 120 seconds |
| Input 5 Burnout | 206 | 11 | 0 = None 1 = Upscale 2 = Downscale |
| Input 5 Emissivity | 097 | 18 | 0.01 to 1.00 |

8.10 Configuration Parameters - UDC 6300, Continued

Control and Control 2 Table 8-26 lists all the I.D. codes and ranges or selections for the function prompts in setup group “CONTROL OR CONTROL 2.” Loop 1 or 2 address selected in request message.

Table 8-26 Setup Group-Control and Control 2

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| PV Source | 196 | 11 | 0 = Input 1 1 = Input 2 2 = Input 3 3 = Input 4 4 = Input 5 5 = Input Algorithm 1 6 = Input Algorithm 2 |
| Tuning Parameter Selection | 172 | 11 | 0 = One set only 1 = 2 sets keyboard selected 2 = 2 sets with PV automatic switchover 3 = 2 sets with setpoint automatic switchover 4 = Gain scheduling |
| Automatic Switchover Value (used with 172 selection 2 or 3) | 056 | 18 | Within the PV Range in engineering units |
| Local Setpoint Source | 173 | 11 | 0 = One Local Setpoint 1 = Two Local Setpoints 3 = Three Local Setpoints |
| PV Tracking | 130 | 11 | 0 = No 1 = Yes |

8.10 Configuration Parameters - UDC 6300, Continued

Control and Control 2,
continued

Table 8-26 Setup Group-Control and Control 2, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection | | | | | | | | | | |
|--|------------------|-------------|--|--------------------|----------|---------------|--------|----------------|--------|---------------|----------|----------------|----------|
| Setpoint Source | 197 | 11 | 0 = Local Setpoint only 1 = Remote Setpoint via Input 2 2 = Remote Setpoint via Input 3 3 = Remote Setpoint via Input 4 4 = Remote Setpoint via Input 5 5 = RSP using Input Algorithm 1 6 = RSP using Input Algorithm 2 | | | | | | | | | | |
| Auto-Bias (LSP to RSP) | 198 | 11 | 0 = Disabled (bump) 1 = Enabled (bumpless) | | | | | | | | | | |
| Setpoint Tracking | 138 | 11 | <table><tr><th>SP Tracking Output</th><th>Power UP</th></tr><tr><td>0 = NO</td><td>Recall</td></tr><tr><td>1 = YES</td><td>Recall</td></tr><tr><td>2 = NO</td><td>Failsafe</td></tr><tr><td>3 = YES</td><td>Failsafe</td></tr></table> | SP Tracking Output | Power UP | 0 = NO | Recall | 1 = YES | Recall | 2 = NO | Failsafe | 3 = YES | Failsafe |
| SP Tracking Output | Power UP | | | | | | | | | | | | |
| 0 = NO | Recall | | | | | | | | | | | | |
| 1 = YES | Recall | | | | | | | | | | | | |
| 2 = NO | Failsafe | | | | | | | | | | | | |
| 3 = YES | Failsafe | | | | | | | | | | | | |
| Control Setpoint High Limit | 007 | 18 | 0 to 100% of PV (engineering units) | | | | | | | | | | |
| Control Setpoint Low Limit | 008 | 18 | 0 to 100% of PV (engineering units) | | | | | | | | | | |
| Control Output Direction/Alarm Outputs | 135 | 11 | 0 = Direct Action Alarm Output energized 1 = Direct Action Alarm Output de-energized 2 = Reverse Action Alarm Output energized 3 = Reverse Action Alarm Output de-energized | | | | | | | | | | |
| High Output Limit | 014 | 18 | –5 to 105% of output | | | | | | | | | | |
| Low Output Limit | 015 | 18 | –5 to 105% of output | | | | | | | | | | |
| High Reset Limit | 016 | 18 | –5 to 105% of output | | | | | | | | | | |

8.10 Configuration Parameters - UDC 6300, Continued

Control and Control 2,
continued

Table 8-26 Setup Group-Control and Control 2, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Low Reset Limit | 017 | 18 | –5 to 105% of output |
| Output Rate | 182 | 11 | 0 = Disable 1 = Enable |
| Output Rate Value Up | 044 | 18 | 0 to 9999%/minute |
| Output Rate Value Down | 046 | 18 | 0 to 9999%/minute |
| Output Dropout | 139 | 11 | 0 = None 1 = Dropout using value selected at ID Code #20 |
| Controller Dropoff Value | 020 | 18 | –5 to 105% of output |
| Output Deadband | 018 | 18 | –5 to +25.0% |
| Output Hysteresis (Loop 1 address only) | 019 | 18 | 0 to 5.0% |
| Failsafe Mode | 199 | 11 | 0 = Latching 1 = Non latching |
| Failsafe Output Level | 040 | 18 | 0 to 100% |
| Proportional Band Units (Loop 1 address only) applies to Loop 1 and 2 | 148 | 11 | 0 = Gain 1 = Proportional band |
| Reset Units (Loop 1 address only) applies to Loop 1 and 2 | 149 | 11 | 0 = Minutes 1 = RPM |

8.10 Configuration Parameters - UDC 6300, Continued

Options

Table 8-27 lists all the I.D. codes and ranges or selections for the function parameters in setup group “OPTIONS.” Loop 1 or 2 is selected in the request message.

Table 8-27 Setup Groups-Options

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| 2nd Current Output | 134 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = PV – Loop 1 4 = Deviation – Loop 1 5 = Output – Loop 1 6 = Setpoint – Loop 1 7 = Input 3 8 = PV – Loop 2 9 = Deviation – Loop 2 10 = Output – Loop 2 11 = Setpoint – Loop 2 12 = Input 4 13 = Input 5 14 = Input Algorithm 1 15 = Input Algorithm 2 16 = LSP1, Loop1 17 = LSP1, Loop2 |
| Low Scaling Factor (Loop 1 address only) | 049 | 18 | Within the range of the selected variable in I.D. 134 |
| High Scaling Factory (Loop 1 address only) | 050 | 18 | Within the range of the selected variable in I.D. 134 |

8.10 Configuration Parameters - UDC 6300, Continued

Options, continued

Table 8-27 Setup Groups-Options, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Digital Input #1 (Loop 1 address only) | 155 | 11 | 0 = None 1 = To Manual 2 = To Local Setpoint #1 3 = To Local Setpoint #2 4 = To Direct Action 5 = To Hold Ramp 6 = To PID Set #2 7 = PV = Input 2 8 = PV = Input 3 9 = To Run Ramp 10 = To Local Setpoint #3 11 = PV = Input 4 12 = PV = Input 5 13 = To Manual/ Failsafe Output 14 = Output 1 tracks Input 4 15 = Output 2 tracks Input 4 16 = Output 2 overrides Output 1 17 = Pulse Down 18 = Out 3 On 19 = Out 4 On 20 = Inhibit Reset 21 = To RSP 22 = Display – Loop 2 23 = Reset FB 24 = To Auto/Man Station 25 = To Purge 26 = To Low Fire 27 = To Tune For 0 through 255 loop selected by address in request message. For digital input combinations see Figure 8-3. |

8.10 Configuration Parameters - UDC 6300, Continued

Options, continued

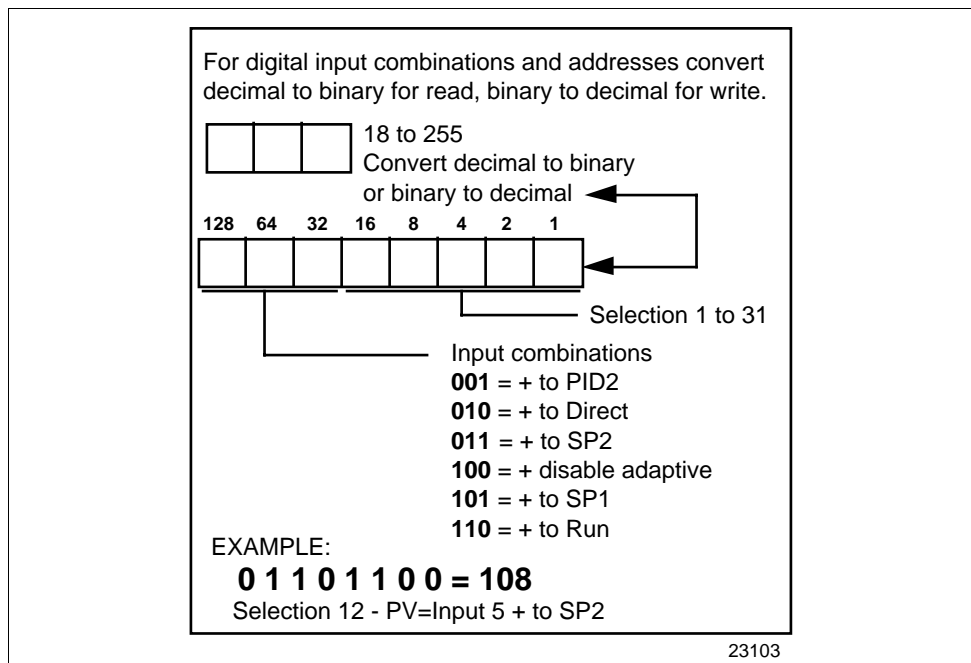
Table 8-27 Setup Groups-Options, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Digital Input #2 (Loop 1 address only) | 156 | 11 | 0 = None 1 = To Manual 2 = To Local Setpoint #1 3 = To Local Setpoint #2 4 = To Direct Action 5 = To Hold Ramp 6 = To PID Set #2 7 = PV = Input 2 8 = PV = Input 3 9 = To Run Ramp 10 = To Local Setpoint #3 11 = PV = Input 4 12 = PV = Input 5 13 = To Manual/ Failsafe Output 14 = Output 1 tracks Input 4 15 = Output 2 tracks Input 4 16 = Output 2 overrides Output 1 17 = Pulse Down 18 = Out 3 On 19 = Out 4 On 20 = Inhibit Reset 21 = To RSP 22 = Display – Loop 2 24 = To Auto/Man Station 25 = To Purge 26 = To Low Fire 27 = To Tune Digital Input 2 combinations are the same as Digital Input 1, Figure 8-3. |

8.10 Configuration Parameters - UDC 6300, Continued

Options, continued

Figure 8-3 Digital Input Combinations, Inputs 1 and 2



8.10 Configuration Parameters - UDC 6300, Continued

Options, continued

Table 8-27 Setup Groups-Options, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Digital Input #3 (Loop 1 address only) | 210 | 11 | 0 = None 1 = To Manual 2 = To Local Setpoint #1 3 = To Local Setpoint #2 4 = To Local Setpoint #3 5 = To Run Ramp 6 = To Hold Ramp 7 = To PID Set #2 8 = PV = Input 1 9 = PV = Input 2 10 = PV = Input 3 11 = PV = Input 4 12 = PV = Input 5 13 = RSP = Input 1 14 = RSP = Input 2 15 = RSP = Input 3 16 = RSP = Input 4 17 = RSP = Input 5 18 = To Direct Action 19 = To Manual/Failsafe Output 20 = To Auto/Man Station 21 = To Purge 22 = To Low Fire |
| Digital Input #4 (Loop 1 address only) | 211 | 11 | Same as I D #210 Digital Input 3 |
| Digital Input #5 (Loop 1 address only) | 212 | 11 | Same as I D #210 Digital Input 3 |
| Digital Input #6 (Loop 1 address only) | 213 | 11 | Same as I D #210 Digital Input 3 |
| Digital Input #3 to 6 (Loop 1 Assignment) | 214 | 11 | 0 = None 1 = D/I 3, 4, & 5 only 2 = D/I 3, & 4 only 3 = D/I 3 only |

8.10 Configuration Parameters - UDC 6300, Continued

Communications

Table 8-28 lists all the I.D. codes and ranges or selections for the function parameters in setup group “COM.” Loop 1 or 2 is selected in the request message.

Table 8-28 Setup Group-Communications

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Shed Time (Loop 1 address only) | 154 | 11 | 0 = No Shed 1 = 255 sample periods |
| Shed Mode and Output (Loop 1 address only) Selections apply to either loop | 162 | 11 | 0 = Last Mode and Last Output 1 = Manual Mode, Last Output 2 = Manual Mode, Failsafe Output 3 = Automatic Mode |
| Shed Setpoint Recall (Loop 1 address only) Selections apply to either loop | 163 | 11 | 0 = To Last Local Setpoint used 1 = Last Setpoint prior to Shed |
| Communication Override Units (Loop 1 address only) applies to Loop 1 and 2 | 161 | 11 | 0 = Percent 1 = Engineering Units |
| Computer Setpoint Ratio | 021 | 18 | –20.00 to 20.00 |
| Computer Setpoint Bias | 022 | 18 | –999 to 9999. |

8.10 Configuration Parameters - UDC 6300, Continued

Alarms

Tables 8-29 lists all the I.D. codes and ranges or selections for the function parameters in setup group “ALARMS.”

Table 8-29 Setup Group-Alarms (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------|------------------|-------------|--|
| Alarm 1 Setpoint 1 Value | 009 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 1 Setpoint 2 Value | 010 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 2 Setpoint 1 Value | 011 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 2 Setpoint 2 Value | 012 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 3 Setpoint 1 Value | 022*** | 48 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 3 Setpoint 2 Value | 023*** | 48 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 4 Setpoint 1 Value | 024*** | 48 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 4 Setpoint 2 Value | 025*** | 48 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 1 Setpoint 1 Type | 140 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = PV – Loop 1 4 = Deviation – Loop 1 5 = Output – Loop 1 6 = Alarm on Shed 9 = Input 3 10 = PV – Loop 2 11 = Deviation – Loop 2 12 = Output – Loop 2 13 = Input 4 14 = Input 5 15 = Manual Loop 1 16 = Manual Loop 2 17 = RSP Loop 1 18 = RSP Loop 2 19 = Failsafe Loop 1 20 = Failsafe Loop 2 |

***Extended Code - Use Format Code 48

8.10 Configuration Parameters - UDC 6300, Continued

Alarms, continued

Table 8-29 Setup Group-Alarms (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------|------------------|-------------|----------------------------------|
| Alarm 1 Setpoint 2 Type | 142 | 11 | Same as 140 |
| Alarm 2 Setpoint 1 Type | 144 | 11 | Same as 140 |
| Alarm 2 Setpoint 2 Type | 146 | 11 | Same as 140 |
| Alarm 3 Setpoint 1 Type | 215 | 11 | Same as 140 |
| Alarm 3 Setpoint 2 Type | 217 | 11 | Same as 140 |
| Alarm 4 Setpoint 1 Type | 219 | 11 | Same as 140 |
| Alarm 4 Setpoint 2 Type | 221 | 11 | Same as 140 |
| Alarm 1 Setpoint 1 Event | 141 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 1 Setpoint 2 Event | 143 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 2 Setpoint 1 Event | 145 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 2 Setpoint 2 Event | 147 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 3 Setpoint 1 Event | 216 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 3 Setpoint 2 Event | 218 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 4 Setpoint 1 Event | 220 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 4 Setpoint 2 Event | 222 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm Hysteresis | 041 | 18 | 0.0 to 5.0% of output or span |
| Alarm Latching for Output 1 | 200 | 11 | 0 = Non Latching 1 = Latching |
| Alarm Latching for Output2 | 201 | 11 | 0 = Non Latching 1 = Latching |
| Alarm Latching for Output 3 | 223 | 11 | 0 = Non Latching 1 = Latching |
| Alarm Latching for Output 4 | 224 | 11 | 0 = Non Latching 1 = Latching |

8.10 Configuration Parameters - UDC 6300, Continued

Display

Table 8-30 lists all the I.D. codes and ranges or selections for the function parameters in setup group “DISPLAY.” Loop 1 or 2 is selected by address in the request message.

Table 8-30 Setup Group-Display

| Parameter Description | Identifying Code | Format Code | Range or Selection | |
|---|------------------|-------------|--|--|
| Temperature Units and Decimal Point Place | 129 | 11 | <div>Units</div> <div>Decimal Places</div> <div><div>0 = °F0</div><div>1 = °C0</div><div>2 = °F1</div><div>3 = °C1</div><div>4 = °F2</div><div>5 = °C2</div><div>6 = °F3</div><div>7 = °C3</div><div>8 = None0</div><div>9 = None1</div><div>10 = None2</div><div>11 = None3</div></div> | |
| Language (Displays) | 209 | 11 | <div>0 = English</div> <div>1 = French</div> <div>2 = German</div> | |
| Front Pane Ratio 4 Enabled | 208 | 11 | <div>0 = Disabled</div> <div>1 = Enabled on Lower Display</div> | |
| Power Frequency (Loop 1 address only) | 166 | 11 | <div>0 = 60 Hertz</div> <div>1 = 50 Hertz</div> | |

Section 9 – Read, Write and Override Parameters on UDC 3300 Process Controllers

9.1 Overview

Introduction

This section contains information concerning Reading, Writing, and Overriding parameters on the UDC 3300 Process Controller. There are two types of parameters:

- Data Transfer—these parameters include reading control data, option status, and reading or changing setpoints or output.
- Configuration Data—all the configuration data is listed in the order in which it appears in the controller.

Each type of parameter has the identifying codes listed with it. Follow the message exchange rules listed in “Read and Write Operations.”

9.1 Overview - UDC 3300, Continued

What's in this section This section contains the following topics:

| Topic | | See Page |
|-------|---|----------|
| 9.1 | Overview | 231 |
| 9.2 | Reading Control Data | 234 |
| 9.3 | Read Option Status | 235 |
| 9.4 | Miscellaneous Read Only's | 236 |
| 9.5 | Setpoints | 238 |
| 9.6 | Using a Computer Setpoint | 239 |
| 9.7 | PV or Setpoint Override | 241 |
| 9.8 | Reading or Changing the Output | 242 |
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| 9.10 | Configuration Parameters Setup Groups | 246 |
| | Tuning (Loop 1) | 247 |
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| | SP Ramp/SP Rate/SP Program | 251 |
| | Accutune | 254 |
| | Algorithm | 255 |
| | Output Algorithm | 260 |
| | Input 1 | 261 |
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| | Input 3 | 265 |
| | Control and Control 2 | 266 |
| | Options | 269 |
| | Communications | 273 |
| | Alarms | 274 |
| | Display | 276 |
| | Maintenance (HealthWatch) | 278 |

9.1 Overview - UDC 3300, Continued

General information

Analog Parameters

- Whenever analog parameters 001 through 114 (those that can be changed via communications) are changed, a Write cycle occurs immediately after receipt of the message.

Override Parameters

- Override analog parameters 120, 123 and 125 (PV, output, computer setpoint) are not stored in non-volatile memory and can be changed as frequently as desired with no effect on non-volatile memory retentivity, but controller must remain in slave mode.

Digital Parameters

- Whenever digital configuration parameters 128 through 250 are updated via communications, the non-volatile memory is updated as soon as the message is received.

9.2 Reading Control Data - UDC 3300

Overview

You can Read the following control data from the UDC controller.

- Input 1
- Input 2
- Input 3
- PV
- Internal RV
- PV, Setpoint, Output

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

I.D. codes

Use the identifying codes listed in Table 9-1 to read the specific items.

A Write request for these codes will result in an Error message.

Table 9-1 Control Data Parameters

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|------------------------------------|
| Input #1 | 118 | 18 | In Engineering Units or Percentage |
| Input #2 | 119 | 18 | In Engineering Units or Percentage |
| Input #3 | 117 | 18 | In Engineering Units or Percentage |
| PV | 120 | 18 | In Engineering Units or Percentage |
| Internal RV | 121 | 18 | In Engineering Units or Percentage |
| PV, Setpoint, and Output* | 122 | 18 | In Engineering Units or Percentage |

*This Read request will give a three variable response (see Read/Write operation).

9.3 Read Options Status - UDC 3300

Read

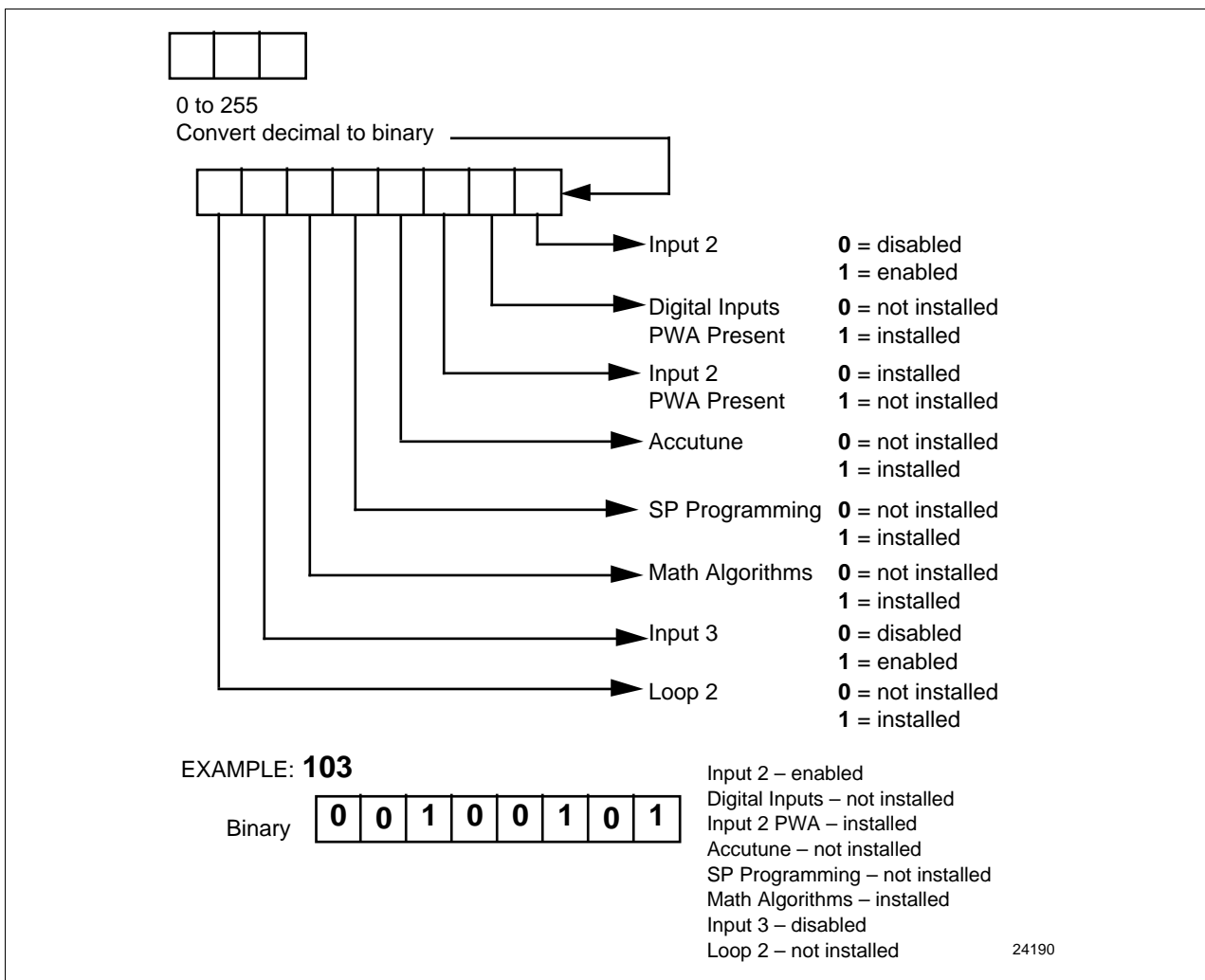
Doing a read of I.D. Code 185 listed in Table 9-2 will tell you which of the available options are enabled/installed or disabled/not installed.

Table 9-2 Option Status

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|--------------------|
| Option Status (Read only) | 185 | 11 | See Figure 9-1 |

The data field in the response message will be a decimal number from 0 to 255. Convert the decimal number to binary as shown in Figure 9-1 to determine which options are or are not active.

Figure 9-1 Option Status Information



9.4 Miscellaneous Read Only's - UDC 3300

I.D. codes for Read Only's

The identifying codes listed in Table 9-3 represent some information that are Read only. No Writes allowed.

Table 9-3 Miscellaneous Read Only's

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| Software Type | 157 | 11 | READ only (UDC 3300) 41 = Basic UDC 3300 software 42 = Field upgrade for SPP 43 = Expanded Controller Version 44 = Field Upgrade for SPP + Math 45 = Field Upgrade for 2 Loops + SPP 46 = Field Upgrade for SPP + 2 Loops + Math 47 = DMCS (UDC 3000 software) 48 = DMCS + Accutune + SPP 49 = Limit Controller |
| Software Version | 167 | 11 | READ only 0 to 255 |
| Auxiliary Output Value | 48 | 18 | READ only Engineering Units for selected type (Write results in error message) |
| Digital Input Switch Status (Read only) | 188 | 11 | <p>The data field in the response message will be a hexadecimal number. Convert the HEX to binary as shown below to determine which Digital Input switches are closed.</p> <div> <p>Convert Hexidecimal to binary</p> <p>Digital Input #1</p> <p>Digital Input #2</p> <p>0 = Switch Open 1 = Switch Closed</p> <p>EXAMPLE: 02</p> <p>Binary 0 0 0 0 0 0 1 0 D/I Switch #1 - Open D/I Switch #2 - Closed</p> <p>24191</p> </div> |

9.4 Miscellaneous Read Only's - UDC 3300, Continued

I.D. codes for Read Only's

Table 9-3 Miscellaneous Read Only's

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| UDC Error Status (Definitions are listed in Table 9-4) Loop 1 or 2 designated in the request message | 255 | 11 | See below READ/WRITE* 001 = Emergency Manual 002 = Failsafe 004 = Working Calibration Checksum Error 008 = Configuration Checksum Error 016 = Factory Calibration Error 032 = Hardware Failure 064 = Restart after Shed 128 = Configuration/Calibration Memory Changed |

* Write to clear.

For example:

If Read returns 192 (restart after shed-64 plus configuration change-128)

Write anything to I.D. Code 255

Read returns 000 (clear).

Error status definitions

Table 9-4 list the UDC error status codes and their definitions.

Table 9-4 Error Status Definitions

| Code | Error | Definitions |
|------|---|--|
| 001 | Emergency Manual | Indicates that the output of the unit which has been in slave operations, is under manual control, locally. Error remains until local control is relinquished at the controller. |
| 002 | Failsafe | Error occurs whenever the control reverts to failsafe operation and remains as long as the condition exists. |
| 004 | Working Calibration Checksum Error | Indicates that an error exists in the working calibration data. Re-select the inputs to load factory calibration data or field calibrate the inputs. |
| 008 | Configuration Checksum Error | Error exists in the configuration data. Verify configuration data at the keyboard. Checksum will be recomputed by stepping the controller through the status tests. |
| 016 | Factory Calibration Error | Error exists in the factory calibration data and remains as long as the condition exists. |
| 032 | Hardware Failure | Indicates either a RAM tests failure or Input 1, Input 2, Input 3 failure on two consecutive conversions. |
| 064 | Restart After Shed | Error occurs whenever a shed of slave override is performed. Error is reset following a WRITE command to I.D. Code 255 (064). |
| 128 | Configuration /Calibration Memory Changed | Error occurs whenever shed, configuration, or calibration changed. Also occurs whenever there is a change of state in 001, 002, 004, 008, or 016. Error is reset following a Write command to I.D. Code 255. |

9.5 Setpoints - UDC 3300

Overview

You can use three separate local setpoints in the UDC Controller. The identifying codes listed Table 9-5 allow you to select which setpoint you want to use and to enter a value in Engineering Units or Percent (whichever is selected at Code 161) for that setpoint via communications.

I.D. codes

Make your selection using I.D. Code 173 and enter the value for the setpoint chosen using ID Code 39 (SP1) or 53 (SP2) or 113 (SP3).

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 9-5 Setpoint Code Selections

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|---|
| Local Setpoint #1 | 039 | 18 | Value within the setpoint range limits |
| Local Setpoint #2 | 053 | 18 | Value within the setpoint range limits |
| Local Setpoint #3 | 116 | 18 | Value within the setpoint range limits |
| Number of Local Setpoints | 173 | 11 | 000 = Local Setpoint #1 only 001 = 2nd Local Setpoint via keyboard or communications 003 = 3rd Local Setpoint via keyboard or communications (This disables RSP.) |

Associated parameters

Refer to Table 9-6 to display or change any of the parameters associated with the setpoint.

Table 9-6 Setpoint Associated Parameters

| Parameter | Code |
|-------------------|----------|
| Setpoint Limits | 007, 008 |
| Computer Setpoint | 125 |

9.6 Using a Computer Setpoint(Overriding Controller Setpoint) - UDC 3300

Overview You can use a setpoint generated from the computer to override the setpoint being used by the controller.

The value generated by the computer will have ratio and bias applied by the controller.

I.D. codes Use the Identifying Code in Table 9-7 to enter the computer setpoint.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 9-7 Computer Setpoint Selection

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Computer Setpoint | 125 | 18 | Value from computer with Ratio/Bias applied by the controller. Within the Setpoint Range Limits in Engineering Units or Percent. |

Shed The computer setpoint override will continue until "SHED" from communications occurs or the controller is placed into monitor mode through communications. Doing periodic "SLAVE READS" within the shed time will allow the override to continue until communication is stopped and shed time elapses.

ATTENTION 0 Shed (code 154) allows the override to continue indefinitely or until the override is canceled. (See override selection ID Code 183.)

When SP is overridden, the left most digit in the upper display becomes a "C."

9.6 Using a Computer Setpoint (Overriding Controller Setpoint) - UDC 3300, Continued

Associated parameters

Refer to Table 9-8 for the codes to display or change any of the parameters associated with the computer setpoint.

Table 9-8 Computer Setpoint Associated Parameters

| Parameter | Code |
|---------------------------------|----------|
| Setpoint Limits | 007, 008 |
| Local Setpoint #1 | 039 |
| Local Setpoint #2 | 053 |
| Local Setpoint #3 | 116 |
| Local Setpoint Selection | 173 |
| Loop #1 Computer Setpoint Ratio | 021 |
| Loop #1 Computer Setpoint Bias | 022 |

9.7 PV or Setpoint Override Selections - UDC 3300

Overview You can **Read** the present override status or the PV or setpoint or you can do a **Write** transaction to cancel the override.

I.D. codes Use the Identifying Code in Table 9-9 to Read or Write your selection.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 9-9 PV or Setpoint Override Selections

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------------|------------------|-------------|--|
| PV or Setpoint Override Selection | 183 | 11 | 01 = Input 1 02 = Input 2 04 = PV 08 = Setpoint Limit Controller <i>FM Units (Read Only):</i> 0 = Unlatched 1 = Latched Relay <i>Non-FM Units (Read/Write):</i> Write 0 to Reset relay |

9.8 Reading or Changing the Output - UDC 3300

Overview You can read the output of a particular UDC controller (Read transaction) or you can change it to suit your needs. (Do a Write transaction.)

I.D. codes Use the identifying code in Table 9-10 to monitor (Read) or change (Write the output (in manual only).

ATTENTION To Write (change) the output, the controller must first be in manual mode.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 9-10 Reading or Changing the Output

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Output | 123 | 18 | -5 to +105% of full span (current output) 0 to 100% (relay type output) |

Associated parameters Refer to Table 9-11 for the codes required to display or change any of the parameters associated with the output.

Table 9-11 Associated Output Codes

| Parameter | Code |
|------------------------|----------|
| Output Limits | 014, 015 |
| Output Dropoff Limits | 020 |
| Failsafe Output Values | 040 |
| Output Deadband | 018 |
| Output Hysteresis | 019 |
| Output Type | 160 |

9.9 Local Setpoint/PID Selection/Setpoint Ramp Status – UDC 3300

Overview

Identifying Code 250 lets you monitor or make selections for:

- Tuning Parameter Set #1 or #2
If Tuning Sets selection is “two keyboard” code 172 = 001
- Local Setpoint #1, #2, or #3
If “2 Local Setpoints” is selected 131 = 0, 173 = 1
- Run or Hold Setpoint Ramp or a Setpoint Program Data
If SP Ramp or SP Program is enabled 178 = 1 Program, 178 = 2 Ramp

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Read

Table 9-12 is a table of numbers that could be returned by the UDC 3300 controller. When a Read is requested for this I.D. Code (250) you can determine which parameters are active from this table.

Write

To Write information to the controller, select what parameters you want from Table 9-12 and enter the associated number in the data field of the Write request.

For example:

Suppose you want to change from TUNING SET #1 to TUNING SET #2 while maintaining LOCAL SETPOINT #1 and SP RAMP STATUS = HOLD.

READ 250 response is 00 or 02

WRITE 250 (07)

READ 250 response is 018

Note: Some of the numbers are Read only.

Table 9-12 LSP/PID Set Selection and Setpoint Ramp Status

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--------------------|
| Enhanced Function | 250 | 11 | See Figure 9-2 |

9.9 Local Setpoint/PID Selection/Setpoint Ramp Status - UDC 3300, Continued

Read, continued

Figure 9-2 I.D. Code 250 Indications

| <p>Tuning Set #2 Selection Local Setpoint #3 Selection</p> <p>Tuning Set #1 Selection Local Setpoint #3 Selection</p> <p>Tuning Set #2 Selection Local Setpoint #2 Selection</p> <p>Tuning Set #2 Selection Local Setpoint #1 Selection</p> <p>Tuning Set #1 Selection Local Setpoint #2 Selection</p> <p>Tuning Set #1 Selection Local Setpoint #1 Selection</p> | | | | | | |
|---|-----|-----|-----|-----|-----|-----|
| Setpoint Ramp or Program Data Selections | | | | | | |
| SP Ramp, Enabled Not in Progress | 000 | 008 | 016 | 024 | 032 | 048 |
| SP Ramp in Progress, Hold | 002 | 010 | 018 | 026 | 034 | 050 |
| SP Ramp in Progress, Run | 003 | 011 | 019 | 027 | 035 | 051 |
| SP Program, Enabled Not in Progress, (READ) | 004 | 012 | 020 | 028 | 036 | 052 |
| SP Program in Progress, Hold (READ/WRITE) | 006 | 014 | 022 | 030 | 038 | 054 |
| SP Program in Progress, Run (READ/WRITE) | 007 | 015 | 023 | 031 | 039 | 055 |

24192

9.9 Local Setpoint/PID Selection /Setpoint Ramp Status - UDC 3300, Continued

Write

A write of code 250 lets you change the SP ramp status as well as the local setpoint or tuning set selection. Refer to Table 9-13.

ATTENTION Loop 1 or Loop 2 is selected by address in request message.

Table 9-13 I.D. Code 250 Writes

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Write Local Setpoint/PID Set Selection and SP Ramp Status | 250 | 11 | 000 = Abort SP Ramp 001 = Run SP Ramp 002 = Hold SP Ramp 003 = Start SP Ramp 004 = Change to Local Setpoint #1 005 = Change to Local Setpoint #2 006 = Change to PID Tuning Set #1 007 = Change to PID Tuning Set #2 008 = Change to Local Setpoint #3 |

ATTENTION

To enable or disable the setpoint ramp, refer to Identifying Code 150.

9.10 Configuration Parameters - UDC 3300

Overview

Listed on the next pages are the identifying codes for the parameters in the various Setup Groups in the UDC 3300 Process Controller. The table below lists the Setup Groups and their table numbers in which they are listed. Most of the parameters are configurable through the hosts. Some are Read Only and are indicated as such and cannot be changed.

| Setup Group | Table Number |
|--------------------------|--------------|
| TUNING | 9-14 |
| TUNING L2 | 9-15 |
| SP RAMP / RATE / PROGRAM | 9-16 |
| ADAPTIVE | 9-17 |
| ALGORITHM | 9-18 |
| OUTPUT ALGORITHM | 9-19 |
| INPUT 1 | 9-20 |
| INPUT 2 | 9-21 |
| INPUT 3 | 9-22 |
| CONTROL AND CONTROL 2 | 9-23 |
| OPTIONS | 9-24 |
| COMMUNICATIONS | 9-25 |
| ALARMS | 9-26 |
| DISPLAY | 9-27 |

Reading or writing

Do a Read or Write (see “Read/Write Operations”), depending on your requirements using the identifying code and format code listed in the tables. The range or selection available for each range is listed in the tables.

9.10 Configuration Parameters - UDC 3300, Continued

Tuning

Table 9-14 lists all the I.D. codes and ranges or selections for the function parameters in the Setup Group “TUNING” (Loop 1).

Table 9-14 Setup Group-Tuning (Loop 1)*

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Gain #1 or PB Note 1 | 001 | 18 | 0.01 to 1000 Gain 0.1 to 9999 PB |
| Rate #1 Note 1 | 002 | 18 | 0.00 to 10.00 |
| Reset #1 Note 1 | 003 | 18 | 0.02 to 50.00 |
| Manual Reset | 013 | 18 | -100 to +100 |
| Gain #2 or PB Note 1 | 004 | 18 | 0.01 to 1000 |
| Rate #2 Note 1 | 005 | 18 | 0.00 to 10.00 |
| Reset #2 Note 1 | 006 | 18 | 0.02 to 50.00 |
| Cycle Time #1 | 158 | 11 | 1 to 120 seconds |
| Cycle Time #2 | 159 | 11 | 1 to 120 seconds |
| Lockout (keyboard only) Changes to data always possible via communications regardless of this configuration. | 132 | 11 | 0 = No Lockout 1 = Calibration only 2 = Calibration + Configuration 3 = Calibration + Configuration + View 4 = Maximum Lockout |
| Keyboard Lockout | 191 | 11 | 0 = All keys enabled 1 = Manual Auto Key Locked 2 = Setpoint Select Key Locked 3 = Manual/Auto and Setpoint Select Keys Locked 4 = Run Hold Key Locked 5 = Run Hold Key and Manual/Auto Keys Locked 6 = Run Hold Key and Setpoint Select Keys Locked 7 = Run Hold, Setpoint Select, and Manual/Auto Keys Locked |

NOTE 1: Writes to these locations not available when Accutune is enabled.

9.10 Configuration Parameters - UDC 3300, Continued

Tuning, continued

Table 9-14 Setup Group-Tuning (Loop 1)*, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------|------------------|-------------|--------------------|
| PV1 Value gain scheduling | 001** | 48 | –9999 to 9999 |
| PV2 Value gain scheduling | 002** | 48 | –9999 to 9999 |
| PV3 Value gain scheduling | 003** | 48 | –9999 to 9999 |
| PV4 Value gain scheduling | 004** | 48 | –9999 to 9999 |
| PV5 Value gain scheduling | 005** | 48 | –9999 to 9999 |
| PV6 Value gain scheduling | 006** | 48 | –9999 to 9999 |
| PV7 Value gain scheduling | 007** | 48 | –9999 to 9999 |
| PV8 Value gain scheduling | 008** | 48 | –9999 to 9999 |
| Gain 1 value gain scheduling | 009** | 48 | 0.001 to 1000 |
| Gain 2 value gain scheduling | 010** | 48 | 0.001 to 1000 |
| Gain 3 value gain scheduling | 011** | 48 | 0.001 to 1000 |
| Gain 4 value gain scheduling | 012** | 48 | 0.001 to 1000 |
| Gain 5 value gain scheduling | 013** | 48 | 0.001 to 1000 |
| Gain 6 value gain scheduling | 014** | 48 | 0.001 to 1000 |
| Gain 7 value gain scheduling | 015** | 48 | 0.001 to 1000 |
| Gain 8 value gain scheduling | 016** | 48 | 0.001 to 1000 |

*Loop selected by address in request message.

**Extended Codes—Use Format Code 48.

9.10 Configuration Parameters - UDC 3300, Continued

Tuning 2

Table 9-15 lists all the I.D. codes and ranges or selections for the function parameters in the Setup Group “TUNING 2.”

ATTENTION Not applicable to Limit Controller.

Table 9-15 Setup Group-Tuning 2* (Loop 2)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------|------------------|-------------|------------------------------------|
| Gain #3 or PB | 001 | 18 | 0.1 to 1000 Gain 0.1 to 9999 PB |
| Rate #3 | 002 | 18 | 0.00 to 10.00 |
| Reset #3 | 003 | 18 | 0.02 to 50.00 |
| Man Reset3 | 013 | 18 | –100 to +100 |
| Gain #4 or PB | 004 | 18 | 0.1 to 1000 |
| Rate #4 | 005 | 18 | 0.00 to 10.00 |
| Reset #4 | 006 | 18 | 0.02 to 50.00 |
| Cycle Time #3 | 158 | 11 | 1 to 120 seconds |
| Cycle Time #4 | 159 | 11 | 1 to 120 seconds |
| PV1 Value gain scheduling | 001** | 48 | –9999 to 9999 |
| PV2 Value gain scheduling | 002** | 48 | –9999 to 9999 |
| PV3 Value gain scheduling | 003** | 48 | –9999 to 9999 |
| PV4 Value gain scheduling | 004** | 48 | –9999 to 9999 |
| PV5 Value gain scheduling | 005** | 48 | –9999 to 9999 |
| PV6 Value gain scheduling | 006** | 48 | –9999 to 9999 |
| PV7 Value gain scheduling | 007** | 48 | –9999 to 9999 |
| PV8 Value gain scheduling | 008** | 48 | –9999 to 9999 |
| Gain 1 value gain scheduling | 009** | 48 | 0.001 to 1000 |

**Extended Codes—Use Format Code 48.

9.10 Configuration Parameters - UDC 3300, Continued

Tuning 2, continued

Table 9-15 Setup Group-Tuning 2* (Loop 2), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------|------------------|-------------|--------------------|
| Gain 2 value gain scheduling | 010** | 48 | 0.001 to 1000 |
| Gain 3 value gain scheduling | 011** | 48 | 0.001 to 1000 |
| Gain 4 value gain scheduling | 012** | 48 | 0.001 to 1000 |
| Gain 5 value gain scheduling | 013** | 48 | 0.001 to 1000 |
| Gain 6 value gain scheduling | 014** | 48 | 0.001 to 1000 |
| Gain 7 value gain scheduling | 015** | 48 | 0.001 to 1000 |
| Gain 8 value gain scheduling | 016** | 48 | 0.001 to 1000 |

*Loop selected by address in request message.

**Extended Codes—Use Format Code 48.

9.10 Configuration Parameters - UDC 3300, Continued

SP ramp/rate/program Table 9-16 lists all the I.D. codes and ranges or selections for the function parameters in setup group “SP RAMP/RATE/PROGRAM.”

ATTENTION Loop 1 or Loop 2 selected by address in request message.

Table 9-16 Setup Group-Setpoint Ramp/Rate

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------------|------------------|-------------|---|
| Setpoint Program Ramp Selection | 178 | 11 | 0 = SP Program, Rate, and Ramp Disabled 1 = SP Program Enabled 2 = SP Ramp Enabled 3 = SP Rate Enabled |
| SP Ramp | 150 | 11 | 0 = OFF 2 = Loop 1 3 = Loop 2 4 = Both Loops |
| Single SP Ramp Time | 174 | 11 | 0 to 255 (minutes) |
| SP Rate | | | |
| Rate Up (EU/HR) | 108 | 18 | 0 to 9999 |
| Rate Down (EU/HR) | 109 | 18 | 0 to 9999 |
| SP Program | | | |
| Start Segment Number | 175 | 11 | 1 to 11 |
| End Segment Number (Soak) | 176 | 11 | 2, 4, 6, 8, 10, or 12 |
| Program Recycles | 177 | 11 | 0 to 99 |
| Guaranteed Soak Deviation | 087 | 18 | 0 to 99.9 (0 = no soak) |
| Segment #1 Ramp Time | 057 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |

9.10 Configuration Parameters - UDC 3300, Continued

Setpoint
ramp/rate/program,
continued

Table 9-16 Setup Group-SP Ramp, Rate, or SP Program, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------------|------------------|-------------|--|
| Segment #2 Soak Setpoint Value | 058 | 18 | Within Setpoint Limits |
| Segment #2 Soak Time | 059 | 18 | 99.59 (0-99 Hrs:0-59 Min) |
| Segment #3 Ramp Time | 060 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |
| Segment #4 Soak Setpoint Value | 061 | 18 | Within Setpoint Limits |
| Segment #4 Soak Time | 062 | 18 | 99.59 (0-99 Hrs:0-59 Min) |
| Segment #5 Ramp Time | 063 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |
| Segment #6 Soak Setpoint Value | 064 | 18 | Within Setpoint Limits |
| Segment #6 Soak Time | 065 | 18 | 99.59 (0-99 Hrs:0-59 Min) |
| Segment #7 Ramp Time | 066 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |
| Segment #8 Soak Setpoint Value | 067 | 18 | Within Setpoint Limits |
| Segment #8 Soak Time | 068 | 18 | 99.59 (0-99 Hrs:0-59 Min) |
| Segment #9 Ramp Time | 069 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |
| Segment #10 Soak Setpoint Value | 070 | 18 | Within Setpoint Limits |
| Segment #10 Soak Time | 071 | 18 | 99.59 (0-99 Hrs:0-59 Min) |
| Segment #11 Ramp Time | 072 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |

9.10 Configuration Parameters - UDC 3300, Continued

Setpoint
Ramp/Rate/Program,
continued

Table 9-16 Setup Group-SP Ramp, Rate, or SP Program, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------------|------------------|-------------|---|
| Segment #12 Soak Setpoint Value | 073 | 18 | Within Setpoint Limits |
| Segment #12 Soak Time | 074 | 18 | 99.59 (0-99 Hrs:0-59 Min) |
| Program End State | 181 | 11 | 0 = Disable SP Program 1 = Hold at Program End |
| Controller Status at Program End | 180 | 11 | 0 = Last Setpoint and Mode 1 = Manual, Failsafe Output |
| Engineering Units or Ramp Segments | 182 | 11 | 0 = HRS:MIN 1 = Degrees/Minute |
| Present Segment Number | 251 | 11 | (READ ONLY) 1 to 12 |
| Time Remaining — Minutes | 252 | 11 | (READ ONLY) 0-59 minutes (SP Program) 0-255 minutes (SP Ramp) |
| Time Remaining — Hours | 253 | 11 | (READ ONLY) 0 to 99 |
| Cycles Remaining | 254 | 11 | (READ ONLY) 0 to 99 |

9.10 Configuration Parameters - UDC 3300, Continued

Accutune

Table 9-17 lists all the I.D. codes and ranges or selections for the function parameters in setup group “ACCUTUNE.” Loop 1 or 2 is selected by address in request message.

Table 9-17 Setup Group-Adaptive Tune

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------------|------------------|-------------|---|
| Fuzzy Overshoot Suppression | 193 | 11 | 0 = Disabled 1 = Loop 1 enabled 2 = Loop 2 enabled 3 = Both loops enabled |
| Accutune Enable – Loops 1 and 2 | 152 | 11 | 0 = Accutune disabled 1 = Limit tune 2 = Limit tune + PV 3 = SP tune – Normal 4 = SP tune – Fast 5 = SP tune + PV – Normal 6 = SP Tune + PV – Fast |
| Setpoint Change | 153 | 11 | 5 to 15% span |
| Process Gain (KPG) | 114 | 18 | 0.10 to 10.00 |
| Accutune Error (Read only) | 151 | 11 | 0 = None 1 = Output less than or greater than Output Limits or Man Step = 0 2 = Output greater or less than Heat/Cool Limits 3 = Not applicable 4 = PV change not sufficient 5 = Process Identification failed 6 = Calculated Reset outside Reset Limits 7 = Calculated Gain outside Gain Limits 8 = Accutune aborted on command 9 = Input 1 error detected 10 = Accutune illegal during Ramp 11 = Accutune aborted when external switch detected 12 = Running |

9.10 Configuration Parameters - UDC 3300, Continued

Algorithm

Table 9-18 lists all the I.D. codes and ranges or selections for the Function Parameters in setup group “ALGORITHM.” Loop 1 or 2 is selected in the request message.

Table 9-18 Setup Group-Algorithm

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Control Algorithm Selection (Selection here will affect I.D. code 160 in "Output Algorithms.") †Not available for Loop 2 | 128 | 11 | 0 = ON/OFF† 1 = PID-A 2 = PID-B 3 = PD-A with Manual Reset 4 = Three Position Step† |
| Loop 2 Selection (Loop 2 address only) | 168 | 11 | 0 = Loop 1 only 1 = Loop 2 enabled 2 = Loop 1 and 2 are cascaded. Loop 2 primary (no output)– Loop 1 secondary. |
| Input Algorithm 1 †Input source selected via ID 205, 206, 207. | 204 | 11 | 0 = None 1 = Weighted Average (LSP)† 2 = Feedforward – Summer† 3 = Feedforward – Multiplier† 4 = Relative Humidity 5 = Summer (with ratio and bias)† 6 = Input High Select (with ratio and bias)† 7 = Input Low Select (with ratio and bias)† 8 = General Math A (sq. rt., mult., div.)† 9 = General Math B (sq. rt., mult.)† 10 = General Math C (mult., div.)† 11 = General Math D (mult.)† 12 = Carbon A 13 = Carbon B 14 = Carbon C 15 = Carbon D 16 = Carbon FCC 17 = Oxygen 18 = Dewpoint |

9.10 Configuration Parameters - UDC 3300, Continued

Algorithm, continued

Table 9-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Input Algorithm 2 †Input source selected via ID 210, 211, 212. | 209 | 11 | 0 = None 1 = Weighted Average† 2 = Feedforward – Summer† 3 = Feedforward – Multiplier† 4 = Relative Humidity 5 = Summer (with ratio and bias)† 6 = Input High Select (with ratio and bias)† 7 = Input Low Select (with ratio and bias)† 8 = General Math A (sq. rt., mult., div.)† 9 = General Math B (sq. rt., mult.)† 10 = General Math C (mult., div.)† 11 = General Math D (mult.)† |
| Timeout Period | 099 | 18 | 00.00 to 99.59 |
| Timer | 216 | 11 | 0 = Disable 1 = Enable |
| Start | 217 | 11 | 0 = Key 1 = Alarm2 |
| LDisp | 218 | 11 | 0 = Ti Rem 1 = E_time |
| Constant K for Math Algorithm 1 | 045 | 18 | 0.001 to 1000 |
| Calc High (for Input Algorithm 1) | 031 | 18 | –999.0 to +9999 in Engineering Units |
| Calc Low (for Input Algorithm 1) | 032 | 18 | –999.0 to +9999 in Engineering Units |
| Constant K for Math Algorithm 2 | 047 | 18 | 0.001 to 1000 |
| Calc High (for Input Algorithm 2) | 051 | 18 | –999.0 to +9999 in Engineering Units |
| Calc Low (for Input Algorithm 2) | 052 | 18 | –999.0 to +9999 in Engineering Units |
| Input Algorithm 1 Input A Selection (used with ID 204 math calculations) | 205 | 11 | 0 = Input 1 1 = Input 2 2 = Loop 1 Output 3 = Loop 2 Output 4 = Input Algorithm 1 5 = Input Algorithm 2 6 = Input 3 |

9.10 Configuration Parameters - UDC 3300, Continued

Algorithm, continued

Table 9-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Input Algorithm 1 Input B Selection (used with ID 204 math calculations) | 206 | 11 | 0 = Input 1 1 = Input 2 2 = Loop 1 Output 3 = Loop 2 Output 4 = Input Algorithm 1 5 = Input Algorithm 2 6 = Input 3 |
| Input Algorithm 1 Input C Selection (used with ID 204 math calculations) | 207 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = Loop 1 Output 4 = Loop 2 Output 5 = Input Algorithm 1 6 = Input Algorithm 2 7 = Input 3 |
| Atmospheric Pressure | 024 | 18 | 590.0 to 760.0 |
| Algorithm 1 bias | 092 | 18 | -999.0 to 9999 in Engineering Units |
| Percent Carbon | 046 | 18 | 0.02 to 0.350 |
| Percent Hydrogen | | 18 | 1 to 99 (% H ₂) |
| Algorithm 2 bias | 093 | 18 | -999.0 to 9999 in Engineering Units |
| Input Algorithm 2 Input A Selection (used with ID 209 math calculations) | 210 | 11 | 0 = Input 1 1 = Input 2 2 = Loop 1 Output 3 = Loop 2 Output 4 = Input Algorithm 1 5 = Input Algorithm 2 6 = Input 3 |
| Input Algorithm 2 Input B Selection (used with ID 209 math calculations) | 211 | 11 | 0 = Input 1 1 = Input 2 2 = Loop 1 Output 3 = Loop 2 Output 4 = Input Algorithm 1 5 = Input Algorithm 2 6 = Input 3 |
| Input Algorithm 2 Input C Selection (used with 209 math calculations) | 212 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = Loop 1 Output 4 = Loop 2 Output 5 = Input Algorithm 1 6 = Input Algorithm 2 7 = Input 3 |

Algorithm, continued

Table 9-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| 8-segment Characterizer 1 | 198 | 11 | 0 = Disable 1 = Input 1 2 = Input 2 3 = Loop 1 – Output 4 = Loop 2 – Output 5 = Input 3 |
| X0 Input to 8-segment characterizer | 026*** | 48 | 0 to 99.99 |
| X1 Input | 027*** | 48 | 0 to 99.99 |
| X2 Input | 028*** | 48 | 0 to 99.99 |
| X3 Input | 029*** | 48 | 0 to 99.99 |
| X4 Input | 030*** | 48 | 0 to 99.99 |
| X5 Input | 031*** | 48 | 0 to 99.99 |
| X6 Input | 032*** | 48 | 0 to 99.99 |
| X7 Input | 033*** | 48 | 0 to 99.99 |
| X8 Input | 034*** | 48 | 0 to 99.99 |
| Y0 Output from 8-segment Characterizer | 035*** | 48 | 0 to 99.99 |
| Y1 Output | 036*** | 48 | 0 to 99.99 |
| Y2 Output | 037*** | 48 | 0 to 99.99 |
| Y3 Output | 038*** | 48 | 0 to 99.99 |
| Y4 Output | 039*** | 48 | 0 to 99.99 |
| Y5 Output | 040*** | 48 | 0 to 99.99 |
| Y6 Output | 041*** | 48 | 0 to 99.99 |
| Y7 Output | 042*** | 48 | 0 to 99.99 |
| Y8 Output | 043*** | 48 | 0 to 99.99 |
| 8-segment Characterizer 2 | 199 | 11 | 0 = Disable 1 = Input 1 2 = Input 2 3 = Loop 1 – Output 4 = Loop 2 – Output 5 = Input 3 |
| X0 Input to 8-segment Characterizer 2 | 045*** | 48 | 0 to 99.99 |
| X1 Input (Char.2) | 046*** | 48 | 0 to 99.99 |

9.10 Configuration Parameters - UDC 3300, Continued

Algorithm, continued

Table 9-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| X2 Input (Char.2) | 047*** | 48 | 0 to 99.99 |
| X3 Input (Char.2) | 048*** | 48 | 0 to 99.99 |
| X4 Input (Char.2) | 049*** | 48 | 0 to 99.99 |
| X5 Input (Char.2) | 050*** | 48 | 0 to 99.99 |
| ***Extended codes—use format code 48. | | | |
| X6 Input (Char.2) | 051*** | 48 | 0 to 99.99 |
| X7 Input (Char.2) | 052*** | 48 | 0 to 99.99 |
| X8 Input (Char.2) | 053*** | 48 | 0 to 99.99 |
| Y0 Output from 8-segment Characterizer2 | 054*** | 48 | 0 to 99.99 |
| Y1 Output (Char.2) | 055*** | 48 | 0 to 99.99 |
| Y2 Output (Char.2) | 056*** | 48 | 0 to 99.99 |
| Y3 Output (Char.2) | 057*** | 48 | 0 to 99.99 |
| Y4 Output (Char.2) | 058*** | 48 | 0 to 99.99 |
| Y5 Output (Char.2) | 059*** | 48 | 0 to 99.99 |
| Y6 Output (Char.2) | 060*** | 48 | 0 to 99.99 |
| Y7 Output (Char.2) | 061*** | 48 | 0 to 99.99 |
| Y8 Output (Char.2) | 062*** | 48 | 0 to 99.99 |
| Totalizer | 194 | 11 | 0 = Disable 1 = Input 1 2 = Input Algorithm 1 3 = Input Algorithm 2 |
| Totalizer Scale Factor (display only) | 195 | 11 | 0 = $10^0 = 1$ 1 = $10^1 = 10$ 2 = $10^2 = 100$ 3 = $10^3 = 1,000$ 4 = $10^4 = 10,000$ 5 = $10^5 = 100,000$ 6 = $10^6 = 1,000,000$ |
| Totalizer Reset Lock (When locked, totalizer cannot be reset from keyboard.) | 196 | 11 | 0 = Unlock 1 = Lock |
| Current Totalizer Value | 103 | 11 | 0 to $10^{14}-1$ NOTE: A value of "0" may be written to reset the totalizer. A write of any other value is not accepted. |

9.10 Configuration Parameters - UDC 3300, Continued

Algorithm, continued

Table 9-18 Setup Group-Algorithm, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|----------------------------|------------------|-------------|---|
| Totalizer Integration Rate | 197 | 11 | 0 = Second 1 = Minute 2 = Hour 3 = Day 4 = Million/Day |

***Extended codes—use format code 48.

9.10 Configuration Parameters - UDC 3300, Continued

Output algorithm

Table 9-19 lists all the I.D. codes and ranges or selections for the function parameters in setup group "OUTPUT ALGORITHM." Loop 1 or 2 is selected in the request message.

Table 9-19 Setup Group-Output Algorithm

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------|------------------|-------------|---|
| Output Algorithm | 160 | 11 | 0 = None (Loop 1) – (Loop 2 disabled) 1 = 3 Position Step or Position Proportioning 2 = Relay Simplex 3 = Relay Duplex (Loop 1 only) 4 = Current Simplex 5 = Current Duplex 6 = Relay/Current Duplex (Relay on Heat/Current Full) 7 = Current/Relay Duplex (Relay on Cool/Current Full) 8 = Current Duplex - Loop 1 only (Current Output - Cool, 2nd Current Output - Heat) 9 = Relay/Current Duplex - Loop 1 only (Relay on Heat/Current Split) 10 = Relay/Current Duplex - Loop 1 only (Relay on Cool/Current Split) |
| Relay Cycle Time Increments | 190 | 11 | 0 = 1 second increments 1 = 1/3 second increments |

9.10 Configuration Parameters - UDC 3300, Continued

Input 1

Table 9-20 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 1.”

Table 9-20 Setup Group-Input 1 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Input 1 Type | 168 | 11 | <p> 0 = Disable 1 = B TC 2 = E TC H 3 = E TC L 4 = J TC H 5 = J TC L 6 = K TC H 7 = K TC L 8 = NNM H 9 = NNM L 10 = NM90 H 11 = NM90 L 12 = Microsil TC 13 = R TC 14 = S TC 15 = T TC H 16 = T TC L 17 = W TC H 18 = W TC L 19 = 100 PT RTD 20 = 100 PT LO RTD 21 = 200 PT RTD 22 = 500 PT RTD 23 = Radiamatic RH 24 = Radiamatic RI 25 = 0-20 mA* 26 = 4-20 mA* 27 = 0-10 mV* 28 = 0-50 mV* 29 = 0-5 Vdc 30 = 1-5 Vdc* 31 = 0-10 Vdc* 32 = Dewpoint 33 = Carbon 34 = Oxygen </p> <p>*Limit: Non-FM only</p> <p>ATTENTION Changing the Input Type will result in the loss of Field Calibration values and will restore the Factory Calibration values.</p> |

9.10 Configuration Parameters - UDC 3300, Continued

Input 1, continued

Table 9-20 Setup Group-Input 1 (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 1 Transmitter Characterization | 169 | 11 | 0 = B TC 1 = E TC H 2 = E TC L 3 = J TC H 4 = J TC L 5 = K TC H 6 = K TC L 7 = NNM TC H 8 = NNM TC L 9 = R TC 10 = S TC 11 = T TC H 12 = T TC L 13 = W TC H 14 = W TC L 15 = 100 PT RTD 16 = 500 PT RTD 17 = 100 PT LO RTD 18 = Linear 19 = Square Root 20 = Nicrosil TC 21 = Radiamatic RH 22 = Radiamatic RI 23 = 200 PT RTD 24 = NM90 H 25 = NM90 L |
| Input 1 High Range Value | 029 | 18 | –999. to 9999. Engineering Units (Linear types only) |
| Input 1 Low Range Value | 030 | 18 | –999 to 9999. Engineering Units (Linear types only) |
| Input 1 Ratio | 106 | 18 | –20.00 to 20.00 |
| Input 1 Bias | 107 | 18 | –999 to 9999. Engineering Units |
| Input 1 Filter | 042 | 18 | 0 to 120 seconds |
| Burnout (Open Circuit Detection) | 164 | 11 | 0 = None and Failsafe 1 = Upscale 2 = Downscale Limit: 0 = Downscale 1 = Upscale <i>Read only, Writes illegal</i> |
| Emissivity | 023 | 18 | 0.01 to 1.00 |

9.10 Configuration Parameters - UDC 3300, Continued

Input 2

Table 9-21 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 2.”

Table 9-21 Setup Group-Input 2 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Input 2 Type | 170 | 11 | <p> 0 = Disable 1 = B TC 2 = E TC H 3 = E TC L 4 = J TC H 5 = J TC L 6 = K TC H 7 = K TC L 8 = NNM H 9 = NNM L 10 = NM90 H 11 = NM90 L 12 = Microsil TC 13 = R TC 14 = S TC 15 = T TC H 16 = T TC L 17 = W TC H 18 = W TC L 19 = 100 PT RTD 20 = 100 PT LO RTD 21 = 200 PT RTD 22 = 500 PT RTD 23 = Radiamatic RH 24 = Radiamatic RI 25 = 0-20 mA 26 = 4-20 mA 27 = 0-10 mV 28 = 0-50 mV 29 = 0-5 Vdc 30 = 1-5 Vdc 31 = 0-10 Vdc 32 = Slidewire </p> <p> ATTENTION Changing the Input Type will result in the loss of Field Calibration values and will restore the Factory Calibration values. </p> |

9.10 Configuration Parameters - UDC 3300, Continued

Input 2, continued

Table 9-21 Setup Group-Input 2 (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 2 Transmitter Characterization | 171 | 11 | 0 = B TC 1 = E TC H 2 = E TC L 3 = J TC H 4 = J TC L 5 = K TC H 6 = K TC L 7 = NNM TC H 8 = NNM TC L 9 = R TC 10 = S TC 11 = T TC H 12 = T TC L 13 = W TC H 14 = W TC L 15 = 100 PT RTD 16 = 500 PT RTD 17 = 100 PT LO RTD 18 = Linear 19 = Square Root 20 = Nicrosil TC 21 = Radiamatic RH 22 = Radiamatic RI 23 = 200 PT RTD 24 = NM90 H 25 = NM90 L |
| Input 2 High Range Value | 035 | 18 | –999. to 9999. Engineering Units |
| Input 2 Low Range Value | 036 | 18 | –999 to 9999. Engineering Units |
| Input 2 Ratio | 037 | 18 | –20.00 to 20.00 |
| Input 2 Bias | 038 | 18 | –999 to 9999. Engineering Units |
| Input 2 Filter | 043 | 18 | 0 to 120 seconds |
| Burnout 2 | 165 | 11 | 0 = None and Failsafe 1 = Upscale 2 = Downscale Limit: 0 = Downscale 1 = Upscale <i>Writes illegal</i> |
| Emissivity 2 | 044 | 18 | 0.01 to 1.00 |

9.10 Configuration Parameters - UDC 3300, Continued

Input 3

Table 9-22 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 3.”

Table 9-22 Setup Group-Input 3 (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 3 Type | 214 | 11 | 0 = Disable 18 = 4-20 mA 21 = 1-5 Vdc 27 = 0-20 mA 28 = 0-5 Vdc <div style="border: 1px solid black; padding: 2px; display: inline-block;">ATTENTION</div> Changing the Input Type will result in the loss of Field Calibration values and will restore the Factory Calibration values. |
| Input 3 Transmitter Characterization | 215 | 11 | 0 = B TC 1 = E TC H 2 = E TC L 3 = J TC H 4 = J TC L 5 = K TC H 6 = K TC L 7 = NNM TC H 8 = NNM TC L 9 = R TC 10 = S TC 11 = T TC H 12 = T TC L 13 = W TC H 14 = W TC L 15 = 100 PT RTD 16 = 500 PT RTD 17 = 100 PT LO RTD 18 = Linear 19 = Square Root 20 = Nicrosil TC 21 = Radamatic RH 22 = Radamatic RI 23 = 200 PT RTD |
| Input 3 High Range Value | 027 | 18 | –999. to 9999. Engineering Units |
| Input 3 Low Range Value | 028 | 18 | –999 to 9999. Engineering Units |
| Input 3 Ratio | 104 | 18 | –20.00 to 20.00 |
| Input 3 Bias | 105 | 18 | –999. to 9999. Engineering Units |
| Input 3 Filter | 033 | 18 | 0 to 120 seconds |

9.10 Configuration Parameters - UDC 3300, Continued

Control and Control 2 Table 9-23 lists all the I.D. codes and ranges or selections for the function prompts in setup group “CONTROL or CONTROL 2.” Loop 1 or 2 address selected in request message.

Table 9-23 Setup Group-Control and Control 2

| Parameter Description | Identifying Code | Format Code | Range or Selection | |
|---|------------------|-------------|--|----------------------|
| PV Source | 133 | 11 | 0 = Input 1 1 = Input 2 2 = Input Algorithm 1 3 = Input Algorithm 2 4 = Input 3 | |
| Tuning Parameter Selection | 172 | 11 | 0 = One set only 1 = 2 sets keyboard selected 2 = 2 sets with PV automatic switchover 3 = 2 sets with setpoint (SP) automatic switchover 4 = Gain scheduling | |
| Automatic Switchover Value (used with 172 selection 2 or 3) | 056 | 18 | Within the PV Range in engineering units | |
| Local Setpoint Source (Number of LSP's) | 173 | 11 | 0 = One Local Setpoint 1 = Two Local Setpoints 3 = Three Local Setpoints (disables RSP) | |
| Power Up Mode Recall | 130 | 11 | Control Mode | Setpoint Mode |
| | | | 0 = MAN | LSP1 |
| | | | 1 = AUTO | LSP1 |
| | | | 2 = AUTO | Last SP |
| | | | 3 = LAST | Last SP |
| | | | 4 = LAST | Last local SP |

9.10 Configuration Parameters - UDC 3300, Continued

Control and Control 2,
continued

Table 9-23 Setup Group-Control and Control 2, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Setpoint Source | 131 | 11 | 0 = Local Setpoint only 1 = Remote Setpoint via Input 1 2 = Remote Setpoint via Input 2 3 = Remote Setpoint using Input Algorithm 1 4 = Remote Setpoint using Input Algorithm 2 5 = Remote Setpoint via Input 3 |
| Auto-Bias (LSP to RSP) | 137 | 11 | 0 = Disabled (bump) 1 = Enabled (bumpless) |
| Setpoint Tracking | 138 | 11 | 0 = None 1 = LSP = PV (when in Manual) 2 = LSP = RSP |
| Control Setpoint High Limit | 007 | 18 | 0 to 100% of PV (engineering units) |
| Control Setpoint Low Limit | 008 | 18 | 0 to 100% of PV (engineering units) |
| Control Output Direction/Alarm Outputs | 135 | 11 | 0 = Direct Action Alarm Output energized 1 = Direct Action Alarm Output de-energized 2 = Reverse Action Alarm Output energized 3 = Reverse Action Alarm Output de-energized |
| High Output Limit | 014 | 18 | –5 to 105% of output |
| Low Output Limit | 015 | 18 | –5 to 105% of output |
| High Reset Limit | 016 | 18 | –5 to 105% of output |

9.10 Configuration Parameters - UDC 3300, Continued

Control and Control 2,
continued

Table 9-23 Setup Group-Control and Control 2, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Low Reset Limit | 017 | 18 | –5 to 105% of output |
| Output Change Rate Limiting | 189 | 11 | 0 = Disable 1 = Enable |
| Output Change Rate Up | 110 | 18 | 0 to 9999%/minute |
| Output Change Rate Down | 111 | 18 | 0 to 9999%/minute |
| Output Dropout | 139 | 11 | 0 = None 1 = Dropout using value selected at ID Code #20 |
| Controller Dropoff Value | 020 | 18 | –5 to 105% of output |
| Output Deadband | 018 | 18 | –5 to +25.0% |
| Output Hysteresis (Loop 1 address only) | 019 | 18 | 0 to 5.0% |
| Failsafe Mode | 213 | 11 | 0 = Latching 1 = Non latching |
| Failsafe Output Level | 040 | 18 | 0 to 100% |
| Manual Power Up Output | 112 | 18 | 0 to 100 |
| Auto Power Up Output | 113 | 18 | 0 to 100 |
| Proportional Band Units (Loop 1 address only) applies to Loop 1 and 2 | 148 | 11 | 0 = Gain 1 = Proportional band |
| Reset Units (Loop 1 address only) applies to Loop 1 and 2 | 149 | 11 | 0 = Minutes 1 = RPM |

9.10 Configuration Parameters - UDC 3300, Continued

Options

Table 9-24 lists all the I.D. codes and ranges or selections for the function parameters in setup group “OPTIONS.” Loop 1 or 2 is selected in the request message.

Table 9-24 Setup Groups-Options

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Auxiliary Output | 134 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = PV – Loop 1 4 = Deviation – Loop 1 5 = Output – Loop 1 6 = Setpoint – Loop 1 7 = LSP1 – Loop 1 8 = Input Algorithm 1 9 = Input Algorithm 2 10 = Input 3 12 = PV – Loop 2 13 = Deviation – Loop 2 14 = Output – Loop 2 15 = Setpoint – Loop 2 16 = LSP1 – Loop 2 |
| Low Scaling Factor (Loop 1 address only) | 049 | 18 | Within the range of the selected variable in I.D. 134 |
| High Scaling Factory (Loop 1 address only) | 050 | 18 | Within the range of the selected variable in I.D. 134 |

9.10 Configuration Parameters - UDC 3300, Continued

Options, continued

Table 9-24 Setup Groups-Options, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Digital Input #1 (Loop 1 address only) | 186 | 11 | <p> 0 = None 1 = To Manual 2 = To Local Setpoint #1 3 = To Local Setpoint #2 4 = To Direct Action 5 = To Hold Ramp 6 = To PID Set #2 7 = PV = Input 2 8 = To Run Ramp 9 = Reset SP Program 10 = Inhibit Reset 11 = To Manual/Failsafe Output 12 = Disable Keyboard 13 = To Automatic Output 14 = To Timer 15 = To Auto/Man Station 16 = To Local Setpoint #3 17 = Initiate Limit Cycle Tuning 18 = Setpoint Initialization 19 = Output 1 Tracks Input 2 20 = Output 2 Overrides Output 1 21 = To RSP 22 = Display Other Loop on Closure 23 = External Reset Feedback 24 = To Purge 25 = To Low Fire 26 = Track 2 27 = Manual Latching 28 = PV = Input 3 29 = Rerun </p> <p>For 0 through 255 loop selected by address in request message. For digital input combinations see Figure 9-3.</p> |

9.10 Configuration Parameters - UDC 3300, Continued

Options, continued

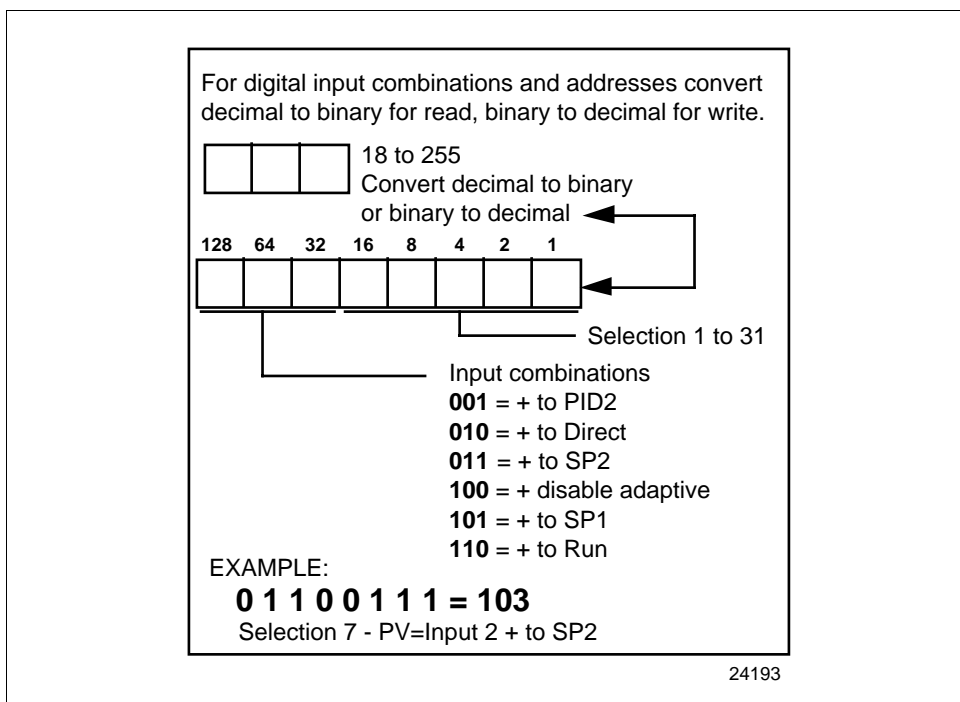
Table 9-24 Setup Groups-Options, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| Digital Input #2 (Loop 1 address only) | 187 | 11 | <p> 0 = None 1 = To Manual 2 = To Local Setpoint #1 3 = To Local Setpoint #2 4 = To Direct Action 5 = To Hold Ramp 6 = To PID Set #2 7 = PV = Input 2 8 = To Run Ramp 9 = Reset SP Program 10 = Inhibit Reset 11 = To Manual/Failsafe Output 12 = Disable Keyboard 13 = To Automatic Output 14 = To Timer 15 = To Auto/Man Station 16 = To Local Setpoint #3 17 = Initiate Limit Cycle Tuning 18 = Setpoint Initialization 19 = Output 1 Tracks Input 2 20 = Output 2 Overrides Output 1 21 = To RSP 22 = Display Other Loop on Closure 23 = External Reset Feedback 24 = To Purge 25 = To Low Fire 26 = Track 2 27 = Manual Latching 28 = Input 3 29 = Rerun </p> <p>For 0 through 255 loop selected by address in request message. For digital input combinations see Figure 9-3.</p> |

9.10 Configuration Parameters - UDC 3300, Continued

Options, continued

Figure 9-3 Digital Input Combinations, Inputs 1 and 2



9.10 Configuration Parameters - UDC 3300, Continued

Communications

Table 9-25 lists all the I.D. codes and ranges or selections for the function parameters in setup group “COM.” Loop 1 or 2 is selected in the request message.

Table 9-25 Setup Group-Communications

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|---|
| Shed Time (Loop 1 address only) | 154 | 11 | 0 = No Shed 1 = 255 sample periods |
| Shed Mode and Output (Loop 1 address only) Selections apply to either loop | 162 | 11 | 0 = Last Mode and Last Output 1 = Manual Mode, Last Output 2 = Manual Mode, Failsafe Output 3 = Automatic Mode |
| Shed Setpoint Recall (Loop 1 address only) Selections apply to either loop | 163 | 11 | 0 = To Last Local Setpoint used 1 = Last Setpoint prior to Shed |
| Communication Override Units (Loop 1 address only) applies to Loop 1 and 2 | 161 | 11 | 0 = Percent 1 = Engineering Units |
| Computer Setpoint Ratio | 021 | 18 | –20.00 to 20.00 |
| Computer Setpoint Bias | 022 | 18 | –999 to 9999. |

9.10 Configuration Parameters - UDC 3300, Continued

Alarms

Table 9-26 lists all the I.D. codes and ranges or selections for the function parameters in setup group “ALARMS.”

Table 9-26 Setup Group-Alarms (Loop 1 Address only)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------|------------------|-------------|--|
| Alarm 1 Setpoint 1 Value | 009 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 1 Setpoint 2 Value | 010 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 2 Setpoint 1 Value | 011 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 2 Setpoint 2 Value | 012 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 1 Setpoint 1 Type | 140 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = PV – Loop 1 4 = Deviation – Loop 1 5 = Output – Loop 1 6 = Alarm on Shed 7 = SP Event On 8 = SP Event Off 9 = Manual – Loop 1 10 = Setpoint – Loop 1 11 = Failsafe – Loop 1 12 = PV Rate of Change – Loop 1 13 = Input 3 15 = PV – Loop 2 16 = Deviation – Loop 2 17 = Output – Loop 2 18 = Manual – Loop 2 19 = Setpoint – Loop 2 20 = Failsafe – Loop 2 21 = PV Rate of Change – Loop 2 Limit Controller: 0 = None 1 = PV 2 = Deviation 3 = Shed |

9.10 Configuration Parameters - UDC 3300, Continued

Alarms, continued

Table 9-26 Setup Group-Alarms (Loop 1 Address only), Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------|------------------|-------------|--|
| Alarm 1 Setpoint 2 Type | 142 | 11 | Same as 140 |
| Alarm 2 Setpoint 1 Type | 144 | 11 | Same as 140 |
| Alarm 2 Setpoint 2 Type | 146 | 11 | Same as 140 |
| Alarm 1 Setpoint 1 Event | 141 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 1 Setpoint 2 Event | 143 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 2 Setpoint 1 Event | 145 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 2 Setpoint 2 Event | 147 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm Hysteresis | 041 | 18 | 0.0 to 5.0% of output or span |
| Alarm Latching for Output 1 | 200 | 11 | 0 = Non Latching 1 = Latching |
| Alarm Latching for Output2 | 201 | 11 | 0 = Non Latching 1 = Latching |

9.10 Configuration Parameters - UDC 3300, Continued

Display

Table 9-27 lists all the I.D. codes and ranges or selections for the function parameters in setup group “DISPLAY.” Loop 1 or 2 is selected by address in the request message.

Table 9-27 Setup Group-Display

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------------------|------------------|-------------|---|
| Temperature Units | 129 | 11 | 0 = °F 1 = °C 2 = None |
| Language (Displays) | 192 | 11 | 0 = English 1 = French 2 = German 3 = Spanish 4 = Italian |
| Front Panel Ratio 2 Enabled | 208 | 11 | 0 = Disabled 1 = Enabled on Lower Display |
| Power Frequency (Loop 1 address only) | 166 | 11 | 0 = 60 Hertz 1 = 50 Hertz |
| Decimal Point Location | 155 | 11 | 0 = XXXX – Fixed 1 = XXX.X – Floating decimal point to one 2 = XX.XX – Floating decimal point to two 3 = X.XXX – Floating decimal point to three |

9.10 Configuration Parameters - UDC 3300, Continued

Maintenance (HealthWatch)

Table 9-28 lists all the I.D. codes and ranges or selections for the function parameters in setup group “MAINTENANCE.”

Table 9-28 Setup Group-Maintenance

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-------------------------|------------------|-------------|--|
| TIMER 1 | 220 | 11 | 0: DISABLE 1: LAST RESET 2: ALARM 1 SETPOINT 1 3: ALARM 1 SETPOINT 2 4: ALARM 2 SETPOINT 1 5: ALARM 2 SETPOINT 2 6: LOOP 1 MANUAL 7: GUARANTEED SOAK 8: SOOTING 9: DIGITAL INPUT1 10: DIGITAL INPUT 2 11: LOOP 2 MANUAL |
| TIMER 1 HOURS & MINUTES | 81 | 18 | 0-9999 |
| TIMER 2 | 221 | 11 | Same as TIMER 1 |
| TIMER 2 HOURS & MINUTES | 82 | 18 | 0-9999 |
| TIMER 3 | 222 | 11 | Same as TIMER 1 |
| TIMER 3 HOURS & MINUTES | 83 | 18 | 0-9999 |

9.10 Configuration Parameters - UDC 3300, Continued

Maintenance (HealthWatch), continued

Table 9-28 lists all the I.D. codes and ranges or selections for the function parameters in setup group “MAINTENANCE.”

Table 9-28 Setup Group-Maintenance (continued)

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| COUNTER 1 | 223 | 11 | 0: DISABLE 1: LOOP 1 MANUAL 2: ALARM 1 SETPOINT 1 3: ALARM 1 SETPOINT 2 4: ALARM 2 SETPOINT 1 5: ALARM 2 SETPOINT 2 6: DIGITAL INPUT 1 7: DIGITAL INPUT 2 8: OUTPUT 1 RELAY x 1000 9: OUTPUT 2 RELAY x 1000 10: GUARANTEED SOAK 11: POWER CYCLE 12: LOOP 1 PV RANGE 13: LOOP 1 FAILSAFE 14: LOOP 1 TUNE 15: LOOP 2 MANUAL 16: LOOP 2 PV RANGE 17: LOOP 2 FAILSAFE 18: LOOP 2 TUNE |
| COUNTS 1 | 84 | 18 | 0-9999 |
| COUNTER 2 | 224 | 11 | Same as COUNTER 1 |
| COUNTS2 | 85 | 18 | 0-9999 |
| COUNTER 3 | 225 | 11 | Same as COUNTER 1 |
| COUNTS3 | 86 | 18 | 0-9999 |
| RESET TYPE | 219 | 11 | 0: NONE 1: TIMER 1 2: TIMER 2 3: TIMER 3 4: ALL TIMERS 5: COUNTER 1 6: COUNTER 2 7: COUNTER 3 8: ALL COUNTERS 9: ALL TIMERS & COUNTERS 10: AMBIENT TEMPERATURE |

Section 10 – Read, Write and Override Parameters on UDC 2300 Process Controllers

10.1 Overview

Introduction

This section contains information concerning Reading, Writing, and Overriding parameters on the UDC 2300 Process Controller. There are two types of parameters:

- Data Transfer—these parameters include reading control data, option status, and reading or changing setpoints or output.
- Configuration Data—all the configuration data is listed in the order in which it appears in the controller.

Each type of parameter has the identifying codes listed with it. Follow the message exchange rules listed in “Read and Write Operations.”

10.1 Overview - UDC 2300, Continued

What's in this section This section contains the following topics:

| Topic | | See Page |
|-------|---|----------|
| 10.1 | Overview | 277 |
| 10.2 | Reading Control Data | 280 |
| 10.3 | Read Option Status | 281 |
| 10.4 | Miscellaneous Read Only's | 282 |
| 10.5 | Setpoints | 284 |
| 10.6 | Using a Computer Setpoint | 285 |
| 10.7 | PV or Setpoint Override | 287 |
| 10.8 | Reading or Changing the Output | 288 |
| 10.9 | Local Setpoint/PID Set Selection and Setpoint Ramp Status | 289 |
| 10.10 | Configuration Parameters Setup Groups | 292 |
| | Timing | 293 |
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| | SP Ramp/SP Rate/SP Program | 295 |
| | Accutune | 298 |
| | Algorithm | 299 |
| | Input 1 | 300 |
| | Input 2 | 304 |
| | Control | 306 |
| | Communications | 308 |
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10.1 Overview - UDC 2300, Continued

General information

Analog Parameters

- Whenever analog parameters 001 through 114 (those that can be changed via communications) are changed, a Write cycle occurs immediately after receipt of the message.

Override Parameters

- Override analog parameters 120, 123 and 125 (PV, output, computer setpoint) are not stored in non-volatile memory and can be changed as frequently as desired with no effect on non-volatile memory retentivity, but controller must remain in slave mode.

Digital Parameters

- Whenever digital configuration parameters 128 through 250 are updated via communications, the non-volatile memory is updated as soon as the message is received.

10.2 Reading Control Data - UDC 2300

Overview

You can Read the following control data from the UDC controller.

- Input 1
- Input 2
- PV
- Internal RV
- PV, Setpoint, Output

I.D. codes

Use the identifying codes listed in Table 10-1 to read the specific items.

A Write request for these codes will result in an Error message.

Table 10-1 Control Data Parameters

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|------------------------------------|
| Input #1 | 118 | 18 | In Engineering Units or Percentage |
| Input #2 | 119 | 18 | In Engineering Units or Percentage |
| PV | 120 | 18 | In Engineering Units or Percentage |
| Internal RV | 121 | 18 | In Engineering Units or Percentage |
| PV, Setpoint, and Output* | 122 | 18 | In Engineering Units or Percentage |

*This Read request will give a three variable response (see Read/Write operation).

10.3 Read Options Status - UDC 2300

Read

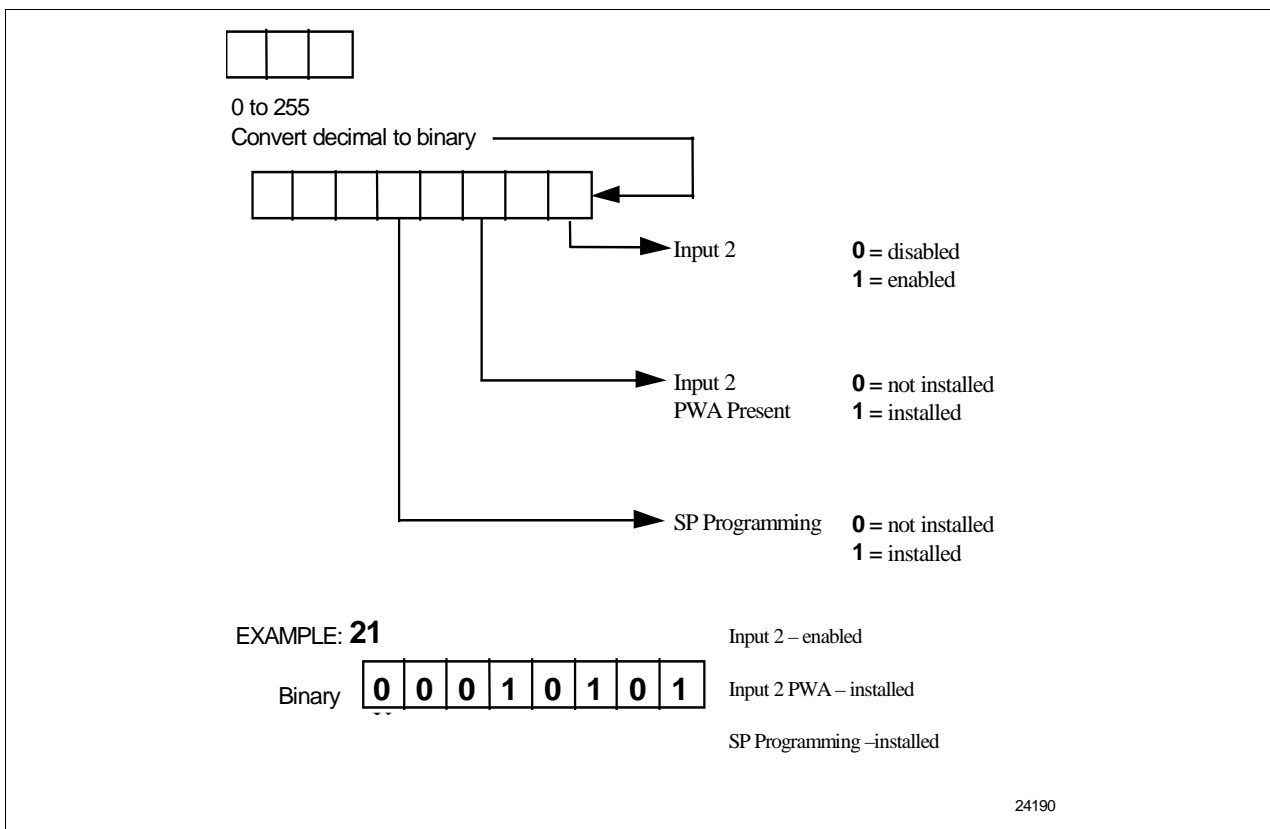
Doing a read of I.D. Code 185 listed in Table 10-2 will tell you which of the available options are enabled/installed or disabled/not installed.

Table 10-2 Option Status

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|--------------------|
| Option Status (Read only) | 185 | 11 | See Figure 10-1 |

The data field in the response message will be a decimal number from 0 to 255. Convert the decimal number to binary as shown in Figure 10-1 to determine which options are or are not active.

Figure 10-1 Option Status Information



10.4 Miscellaneous Read Only's - UDC 2300

I.D. codes for Read Only's

The identifying codes listed in Table 10-3 represent some information that are Read only. No Writes allowed.

Table 10-3 Miscellaneous Read Only's

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Software Type | 157 | 11 | READ only (UDC 2300) A1 = Basic UDC 2300 software A2 = Limit Controller |
| Software Version | 167 | 11 | READ only 0 to 255 |
| UDC Error Status (Definitions are listed in Table 10-4) | 255 | 11 | See below READ/WRITE* 001 = Emergency Manual 002 = Failsafe 004 = Working Calibration Checksum Error 008 = Configuration Checksum Error 016 = Factory Calibration Error 032 = Hardware Failure 064 = Restart after Shed 128 = Configuration/Calibration Memory Changed |

* Write to clear.

For example:

If Read returns 192 (restart after shed-64 plus configuration change-128)

Write anything to I.D. Code 255

Read returns 000 (clear).

10.4 Miscellaneous Read Only's - UDC 2300, Continued

Error status definitions

Table 10-4 list the UDC error status codes and their definitions.

Table 10-4 Error Status Definitions

| Code | Error | Definitions |
|------|---|--|
| 001 | Emergency Manual | Indicates that the output of the unit which has been in slave operations, is under manual control, locally. Error remains until local control is relinquished at the controller. |
| 002 | Failsafe | Error occurs whenever the control reverts to failsafe operation and remains as long as the condition exists. |
| 004 | Working Calibration Checksum Error | Indicates that an error exists in the working calibration data. Re-select the inputs to load factory calibration data or field calibrate the inputs. |
| 008 | Configuration Checksum Error | Error exists in the configuration data. Verify configuration data at the keyboard. Checksum will be recomputed by stepping the controller through the status tests. |
| 016 | Factory Calibration Error | Error exists in the factory calibration data and remains as long as the condition exists. |
| 032 | Hardware Failure | Indicates either a RAM tests failure or Input 1, Input 2, Input 3 failure on two consecutive conversions. |
| 064 | Restart After Shed | Error occurs whenever a shed of slave override is performed. Error is reset following a WRITE command to I.D. Code 255 (064). |
| 128 | Configuration /Calibration Memory Changed | Error occurs whenever shed, configuration, or calibration changed. Also occurs whenever there is a change of state in 001, 002, 004, 008, or 016. Error is reset following a Write command to I.D. Code 255. |

10.5 Setpoints - UDC 2300

Overview

You can use two separate local setpoints in the UDC Controller. The identifying codes listed Table 10-5 allow you to select which setpoint you want to use and to enter a value in Engineering Units or Percent (whichever is selected at Code 161) for that setpoint via communications.

I.D. codes

Make your selection using I.D. Code 173 and enter the value for the setpoint chosen using ID Code 39 (SP1) or 53 (SP2) or 113 (SP3).

Table 10-5 Setpoint Code Selections

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------|------------------|-------------|---|
| Local Setpoint #1 | 039 | 18 | Value within the setpoint range limits |
| Local Setpoint #2 | 053 | 18 | Value within the setpoint range limits |
| Number of Local Setpoints | 173 | 11 | 000 = Local Setpoint #1 only 001 = 2nd Local Setpoint via keyboard or communications |

Associated parameters

Refer to Table 10-6 to display or change any of the parameters associated with the setpoint.

Table 10-6 Setpoint Associated Parameters

| Parameter | Code |
|-------------------|----------|
| Setpoint Limits | 007, 008 |
| Computer Setpoint | 125 |

10.6 Using a Computer Setpoint(Overriding Controller Setpoint) - UDC 2300

Overview You can use a setpoint generated from the computer to override the setpoint being used by the controller.

The value generated by the computer will have ratio and bias applied by the controller.

I.D. codes Use the Identifying Code in Table 10-7 to enter the computer setpoint.

Table 10-7 Computer Setpoint Selection

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Computer Setpoint | 125 | 18 | Value from computer with Ratio/Bias applied by the controller. Within the Setpoint Range Limits in Engineering Units or Percent. |

Shed The computer setpoint override will continue until "SHED" from communications occurs or the controller is placed into monitor mode through communications. Doing periodic "SLAVE READS" within the shed time will allow the override to continue until communication is stopped and shed time elapses.

ATTENTION 0 Shed (code 154) allows the override to continue indefinitely or until the override is canceled. (See override selection ID Code 183.)

When SP is overridden, the upper display will flash "CSP" (provided the SP Programmer is not enabled) and the lower display will show "CSXXXX."

10.6 Using a Computer Setpoint (Overriding Controller Setpoint) - UDC 2300, Continued

Associated parameters

Refer to Table 10-8 for the codes to display or change any of the parameters associated with the computer setpoint.

Table 10-8 Computer Setpoint Associated Parameters

| Parameter | Code |
|--------------------------|----------|
| Setpoint Limits | 007, 008 |
| Local Setpoint #1 | 039 |
| Local Setpoint #2 | 053 |
| Local Setpoint Selection | 173 |
| Computer Setpoint Ratio | 021 |
| Computer Setpoint Bias | 022 |

10.7 PV or Setpoint Override Selections - UDC 2300

Overview

You can **Read** the present override status of the PV or setpoint or you can do a **Write** transaction to cancel the override.

I.D. codes

Use the Identifying Code in Table 10-9 to Read or Write your selection.

Table 10-9 PV or Setpoint Override Selections

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------------|------------------|-------------|---|
| PV or Setpoint Override Selection | 183 | 11 | 01 = Input 1 02 = Input 2 04 = PV 08 = Setpoint Limit Controller (Read Only): 0 = Unlatched 1 = Latched Relay |

10.8 Reading or Changing the Output - UDC 2300

Overview You can read the output of a particular UDC controller (Read transaction) or you can change it to suit your needs. (Do a Write transaction.)

I.D. codes Use the identifying code in Table 10-10 to monitor (Read) or change (Write the output (in manual only).

ATTENTION To Write (change) the output, the controller must first be in manual mode.

Table 10-10 Reading or Changing the Output

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Output | 123 | 18 | -5 to +105% of full span (current output) 0 to 100% (relay type output) |

Associated parameters Refer to Table 10-11 for the codes required to display or change any of the parameters associated with the output.

Table 10-11 Associated Output Codes

| Parameter | Code |
|------------------------|----------|
| Output Limits | 014, 015 |
| Failsafe Output Values | 040 |
| Output Deadband | 018 |
| Output Hysteresis | 019 |
| Output Type | 160 |

10.9 Local Setpoint/PID Selection/Setpoint Ramp Status – UDC 2300

Overview

Identifying Code 250 lets you monitor or make selections for:

- Tuning Parameter Set #1 or #2
If Tuning Sets selection is “two keyboard” code 172 = 001
- Local Setpoint #1 or #2
If “2 Local Setpoints” is selected 131 = 0, 173 = 1
- Run or Hold Setpoint Ramp or a Setpoint Program Data
If SP Ramp or SP Program is enabled 178 = 1 Program, 178 = 2 Ramp

Read

Table 10-12 is a table of numbers that could be returned by the UDC 2300 controller. When a Read is requested for this I.D. Code (250) you can determine which parameters are active from this table.

Write

To Write information to the controller, select what parameters you want from Table 10-12 and enter the associated number in the data field of the Write request.

For example:

Suppose you want to change from TUNING SET #1 to TUNING SET #2 while maintaining LOCAL SETPOINT #1 and SP RAMP STATUS = HOLD.

READ 250 response is 00 or 02

WRITE 250 (07)

READ 250 response is 018

Note: Some of the numbers are Read only.

Table 10-12 LSP/PID Set Selection and Setpoint Ramp Status

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--------------------|
| Enhanced Function | 250 | 11 | See Figure 10-2 |

10.9 Local Setpoint/PID Selection/Setpoint Ramp Status - UDC 2300, Continued

Read, continued

Figure 10-2 I.D. Code 250 Indications

| | | | | |
|--|----|----|----|----|
| Tuning Set #2 Selection Local Setpoint #2 Selection | | | | |
| Tuning Set #2 Selection Local Setpoint #1 Selection | | | | |
| Tuning Set #1 Selection Local Setpoint #2 Selection | | | | |
| Tuning Set #1 Selection Local Setpoint #1 Selection | | | | |
| Setpoint Ramp or Program Data Selections | | | | |
| SP Ramp, Enabled Not in Progress | 00 | 08 | 16 | 24 |
| SP Ramp in Progress, Hold | 02 | 10 | 18 | 26 |
| SP Ramp in Progress, Run | 03 | 11 | 19 | 27 |
| SP Program, Enabled Not in Progress, (READ) | 04 | 12 | 20 | 28 |
| SP Program in Progress, Hold (READ/WRITE) | 06 | 14 | 22 | 30 |
| SP Program in Progress, Run (READ/WRITE) | 07 | 15 | 23 | 31 |

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10.9 Local Setpoint/PID Selection /Setpoint Ramp Status - UDC 2300, Continued

Write

A write of code 250 lets you change the SP ramp status as well as the local setpoint or tuning set selection. Refer to Table 10-13.

Table 10-13 I.D. Code 250 Writes

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Write Local Setpoint/PID Set Selection and SP Ramp Status | 250 | 11 | 000 = Abort SP Ramp 001 = Run SP Ramp 002 = Hold SP Ramp 003 = Start SP Ramp 004 = Change to Local Setpoint #1 005 = Change to Local Setpoint #2 006 = Change to PID Tuning Set #1 007 = Change to PID Tuning Set #2 |

ATTENTION

To enable or disable the setpoint ramp, refer to Identifying Code 150.

10.10 Configuration Parameters - UDC 2300

Overview

Listed on the next pages are the identifying codes for the parameters in the various Setup Groups in the UDC 2300 Process Controller. The table below lists the Setup Groups and their table numbers in which they are listed. Most of the parameters are configurable through the hosts. Some are Read Only and are indicated as such and cannot be changed.

| Setup Group | Table Number |
|--------------------------|--------------|
| TIMER | 10-14 |
| TUNING | 10-15 |
| SP RAMP / RATE / PROGRAM | 10-16 |
| ADAPTIVE | 10-17 |
| ALGORITHM | 10-18 |
| INPUT 1 | 10-19 |
| INPUT 2 | 10-20 |
| CONTROL | 10-21 |
| COMMUNICATIONS | 10-22 |
| ALARMS | 10-23 |

Reading or writing

Do a Read or Write (see “Read/Write Operations”), depending on your requirements using the identifying code and format code listed in the tables. The range or selection available for each range is listed in the tables.

10.10 Configuration Parameters - UDC 2300, Continued

Timer

Table 10-14 lists all the I.D. codes and ranges or selections for the function parameters in the Setup Group “TUNING”.

Table 10-14 Setup Group-Timer

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|---|
| Timer | 216 | 11 | 0 = Disable 1 = Enable |
| Period | 099 | 18 | 0.00 to 99.59 |
| Start (Initiation) | 217 | 11 | 0 = Key (Run/Hold Key) 1 = Alarm 2 |
| LDISP (Selection) | 218 | 11 | 0 = TI REM 1 = Elapsed Time |
| Timer Reset | 214 | 11 | 0 = Key (Run/Hold Key) 1 = ALI (Alarm 1 or Key) |
| Timer Increment | 215 | 11 | 0 = min (Counts hr/min) 1 = sec (counts min/sec) |

Tuning

Table 10-15 lists all the I.D. codes and ranges or selections for the function parameters in the Setup Group “TUNING”.

Table 10-15 Setup Group-Tuning

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-------------------------|------------------|-------------|-------------------------------------|
| Gain #1 or PB Note 1 | 001 | 18 | 0.01 to 1000 Gain 0.1 to 9999 PB |
| Rate #1 Note 1 | 002 | 18 | 0.00 to 10.00 |
| Reset #1 Note 1 | 003 | 18 | 0.02 to 50.00 |
| Manual Reset | 013 | 18 | -100 to +100 |
| Gain #2 or PB Note 1 | 004 | 18 | 0.01 to 1000 |
| Rate #2 Note 1 | 005 | 18 | 0.00 to 10.00 |
| Reset #2 Note 1 | 006 | 18 | 0.02 to 50.00 |
| Cycle Time #1 | 158 | 11 | 1 to 120 seconds |
| Cycle Time #2 | 159 | 11 | 1 to 120 seconds |

Table continued next page

10.10 Configuration Parameters - UDC 2300, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|---|
| Lockout (keyboard only) Changes to data always possible via communications regardless of this configuration. | 132 | 11 | 0 = No Lockout 1 = Calibration Locked Out 2 = Timer, Tuning, SP Ramp, Accutune or Read/Write 3 = Tuning and SP Ramp are read/write, no other parameters are available 4 = Maximum Lockout |
| Keyboard Lockout | 191 | 11 | 0 = All keys enabled 1 = Manual Auto Key Locked 2 = Setpoint Select Key Locked 3 = Manual/Auto and Setpoint Select Keys Locked 4 = Run Hold Key Locked 5 = Run Hold Key and Manual/Auto Keys Locked 6 = Run Hold Key and Setpoint Select Keys Locked 7 = Run Hold, Setpoint Select, and Manual/Auto Keys Locked 8 = Autotune Key Locked 9 = Autotune and Man/Auto Keys Locked 10 = Autotune and Setpoint Select Keys Locked 11 = Autotune , Setpoint Select, and Man/Auto Keys Locked 12 = Autotune and Run/Hold Keys Locked 13 = Autotune, Run/Hold, and Man/Auto Keys Locked 14 = Autotune, Run/Hold, and Setpoint Select Keys Locked 15 = Autotune, Run/Hold, Setpoint Select, and Man/Auto Keys Locked |

NOTE 1: Writes to these locations not available when Accutune is enabled.

10.10 Configuration Parameters - UDC 2300, Continued

SP ramp/rate/program Table 10-16 lists all the I.D. codes and ranges or selections for the function parameters in setup group “SP RAMP/RATE/PROGRAM.”

Table 10-16 Setup Group-Setpoint Ramp/Rate Program

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Setpoint Ramp/Rate Program Selection | 178 | 11 | 0 = SP Program, Rate, and Ramp Disabled 1 = SP Program Enabled 2 = SP Ramp Enabled 3 = SP Rate Enabled |
| SP Ramp | 150 | 11 | 0 = OFF 2 = Ramp |
| Single SP Ramp Time | 174 | 11 | 0 to 255 (minutes) |
| Ramp Final Setpoint | 026 | 18 | 0 to 9999 |
| SP Rate | | | |
| Rate Up (EU/HR) | 108 | 18 | 0 to 9999 |
| Rate Down (EU/HR) | 109 | 18 | 0 to 9999 |
| SP Program | | | |
| Start Segment Number | 175 | 11 | 1 to 11 |
| End Segment Number (Soak) | 176 | 11 | 2, 4, 6, 8, 10, or 12 |
| Engineering Units or Ramp Segments | 182 | 11 | 0 = HRS:MIN 1 = Degrees/Minute |
| Program Recycles | 177 | 11 | 0 to 99 |
| Guaranteed Soak Deviation | 087 | 18 | 0 to 99.9 (0 = no soak) |
| Program End State | 181 | 11 | 0 = Disable SP Program 1 = Hold at Program End |
| Controller Status at Program End | 180 | 11 | 0 = Last Setpoint and Mode 1 = Manual, Failsafe Output |
| Reset SP Program (to begin) | 179 | 11 | 0 = Disable 1 = Via Keyboard 2 = Rerun |
| Segment #1 Ramp Time | 057 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |

10.10 Configuration Parameters - UDC 2300, Continued

Setpoint
ramp/rate/program,
continued

Table 10-16 Setup Group-SP Ramp, Rate, or SP Program, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------------|------------------|-------------|--|
| Segment #2 Soak Setpoint Value | 058 | 18 | Within Setpoint Limits |
| Segment #2 Soak Time | 059 | 18 | 99.59 (0-99 Hrs:0-59 Min) |
| Segment #3 Ramp Time | 060 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |
| Segment #4 Soak Setpoint Value | 061 | 18 | Within Setpoint Limits |
| Segment #4 Soak Time | 062 | 18 | 99.59 (0-99 Hrs:0-59 Min) |
| Segment #5 Ramp Time | 063 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |
| Segment #6 Soak Setpoint Value | 064 | 18 | Within Setpoint Limits |
| Segment #6 Soak Time | 065 | 18 | 99.59 (0-99 Hrs:0-59 Min) |
| Segment #7 Ramp Time | 066 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |
| Segment #8 Soak Setpoint Value | 067 | 18 | Within Setpoint Limits |
| Segment #8 Soak Time | 068 | 18 | 99.59 (0-99 Hrs:0-59 Min) |
| Segment #9 Ramp Time | 069 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |
| Segment #10 Soak Setpoint Value | 070 | 18 | Within Setpoint Limits |
| Segment #10 Soak Time | 071 | 18 | 99.59 (0-99 Hrs:0-59 Min) |
| Segment #11 Ramp Time | 072 | 18 | 99.59 (0-99 Hrs:0-59 Min) or 0 to 999 (Degrees/Minute) |

10.10 Configuration Parameters - UDC 2300, Continued

Setpoint
Ramp/Rate/Program,
continued

Table 10-16 Setup Group-SP Ramp, Rate, or SP Program, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---------------------------------|------------------|-------------|---------------------------|
| Segment #12 Soak Setpoint Value | 073 | 18 | Within Setpoint Limits |
| Segment #12 Soak Time | 074 | 18 | 99.59 (0-99 Hrs:0-59 Min) |

10.10 Configuration Parameters - UDC 2300, Continued

Accutune

Table 10-17 lists all the I.D. codes and ranges or selections for the function parameters in setup group “ACCUTUNE.”

Table 10-17 Setup Group-Adaptive Tune

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------|------------------|-------------|---|
| Fuzzy Overshoot Suppression | 193 | 11 | 0 = Disabled 1 = Enabled |
| Accutune Enable | 152 | 11 | 0 = Accutune disabled 1 = Tune |
| Accutune Error (Read only) | 151 | 11 | 0 = None 3 = Process Identification failed 4 = Accutune aborted on command 5 = Running |

10.10 Configuration Parameters - UDC 2300, Continued

Algorithm

Table 10-18 lists all the I.D. codes and ranges or selections for the Function Parameters in setup group “ALGORITHM.”

Table 10-18 Setup Group-Algorithm

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|---|------------------|-------------|--|
| Control Algorithm Selection (Selection here will affect I.D. code 160 in “Output Algorithms.”) | 128 | 11 | 0 = ON/OFF† 1 = PID-A 2 = PID-B 3 = PD-A with Manual Reset 4 = Three Position Step |
| Output Algorithm | 160 | 11 | 0 = Time Simplex Relay 1 1 = Time Simplex Relay 2 2 = Current Simplex 3 = TPSC 4 = Time Duplex 5 = Current Duplex 6 = Current Time Duplex 7 = Time Current Duplex |
| Relay Cycle Time Increments | 190 | 11 | 0 = 1 second increments 1 = 1/3 second increments |

10.10 Configuration Parameters - UDC 2300, Continued

Input 1

Table 10-19 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 1.”

Table 10-19 Setup Group-Input 1

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------|------------------|-------------|---|
| Decimal Point Location | 155 | 11 | 0 = XXXX – Fixed 1 = XXX.X – Floating decimal point to one 2 = XX.XX – Floating decimal point to two |
| Temperature Units | 129 | 11 | 0 = °F 1 = °C 2 = None |

10.10 Configuration Parameters - UDC 2300, Continued

Input 1, continued

Table 10-19 Setup Group-Input 1, Continued

| | | | |
|--------------|-----|----|---|
| Input 1 Type | 168 | 11 | <p> 1 = B TC 2 = E TC H 3 = E TC L 4 = J TC H 5 = J TC L 6 = K TC H 7 = K TC L 8 = NNM H 9 = NNM L 10 = NM90 H 11 = NM90 L 12 = Nicrosil TC 13 = R TC 14 = S TC 15 = T TC H 16 = T TC L 17 = W TC H 18 = W TC L 19 = 100 PT RTD 20 = 100 PT LO RTD 21 = 200 PT RTD 22 = 500 PT RTD 23 = Radiamatic RH 24 = Radiamatic RI 25 = 0-20 mA* 26 = 4-20 mA* 27 = 0-10 mV* 28 = 0-50 mV* 29 = 0-5 Vdc 30 = 1-5 Vdc* 31 = 0-10 Vdc* 32 = Unused 33 = 100 M </p> <p>*Limit: Non-FM only</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">ATTENTION</div> Changing the Input Type will result in the loss of Field Calibration values and will restore the Factory Calibration values. |
|--------------|-----|----|---|

10.10 Configuration Parameters - UDC 2300, Continued

Input 1, continued

Table 10-19 Setup Group-Input 1, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 1 Transmitter Characterization | 169 | 11 | 0 = B TC 1 = E TC H 2 = E TC L 3 = J TC H 4 = J TC L 5 = K TC H 6 = K TC L 7 = NNM TC H 8 = NNM TC L 9 = NM90 H 10 = NM90 L 11 = Nicrosil TC 12 = R TC 13 = S TC 14 = T TC H 15 = T TC L 16 = W TC H 17 = W TC L 18 = 100 PT RTD 19 = 100 PT LO RTD 20 = 200 PT RTD 21 = 500 PT RTD 22 = Radiamatic RH 23 = Radiamatic RI 24 = Linear 25 = Square Root |
| Input 1 High Range Value | 029 | 18 | –999. to 9999. Engineering Units (Linear types only) |
| Input 1 Low Range Value | 030 | 18 | –999 to 9999. Engineering Units (Linear types only) |
| Input 1 Ratio | 106 | 18 | –20.00 to 20.00 |
| Input 1 Bias | 107 | 18 | –999 to 9999. Engineering Units |
| Input 1 Filter | 042 | 18 | 0 to 120 seconds |
| Burnout (Open Circuit Detection) | 164 | 11 | 0 = None 1 = Upscale 2 = Downscale 3 = NOFS (No Failsafe) Limit: 0 = Downscale 1 = Upscale <i>Read only, Writes illegal</i> |

10.10 Configuration Parameters - UDC 2300, Continued

Input 1, continued

Table 10-19 Setup Group-Input 1, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------|------------------|-------------|--|
| Display | 186 | 11 | 0 = SP (setpoint) 1 = PRY (PV with label) 2 = PRN (PV without label) |
| Language (Displays) | 192 | 11 | 0 = English 1 = French 2 = German 3 = Spanish 4 = Italian |
| Power Frequency | 166 | 11 | 0 = 60 Hertz 1 = 50 Hertz |

10.10 Configuration Parameters - UDC 2300, Continued

Input 2

Table 10-20 lists all the I.D. codes and ranges or selections for the function parameters in setup group “INPUT 2.”

Table 10-20 Setup Group-Input 2

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------------------|------------------|-------------|---|
| Input 2 Type | 170 | 11 | 1 to 24 = Unused 0 = Disable 25 = 0-20 mA 26 = 4-20 mA 29 = 0-5 Vdc 30 = 1-5 Vdc 31 = Unused 32 = Slidewire <div style="border: 1px solid black; padding: 2px; display: inline-block;">ATTENTION</div> Changing the Input Type will result in the loss of Field Calibration values and will restore the Factory Calibration values. |
| Input 2 Transmitter Characterization | 171 | 11 | 0 = B TC 1 = E TC H 2 = E TC L 3 = J TC H 4 = J TC L 5 = K TC H 6 = K TC L 7 = NNM TC H 8 = NNM TC L 9 = NM90 H 10 = NM90 L 11 = Nicrosil TC 12 = R TC 13 = S TC 14 = T TC H 15 = T TC L 16 = W TC H 17 = W TC L 18 = 100 PT RTD 19 = 100 PT LO RTD 20 = 200 PT RTD 21 = 500 PT RTD 22 = Radiamatic RH 23 = Radiamatic RI 24 = Linear 25 = Square Root |
| Input 2 High Range Value | 035 | 18 | –999. to 9999. Engineering Units |

10.10 Configuration Parameters - UDC 2300, Continued

Input 2, continued

Table 10-20 Setup Group-Input 2, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-------------------------|------------------|-------------|---------------------------------|
| Input 2 Low Range Value | 036 | 18 | –999 to 9999. Engineering Units |
| Input 2 Ratio | 037 | 18 | –20.00 to 20.00 |
| Input 2 Bias | 038 | 18 | –999 to 9999. Engineering Units |
| Input 2 Filter | 043 | 18 | 0 to 120 seconds |

10.10 Configuration Parameters - UDC 2300, Continued

Control

Table 10-21 lists all the I.D. codes and ranges or selections for the function prompts in setup group “CONTROL.”

Table 10-21 Setup Group-Control

| Parameter Description | Identifying Code | Format Code | Range or Selection | | | | | | | | | | | | |
|---|------------------|-------------|--|--------------|---------------|----------------|------|-----------------|------|-----------------|----------|-----------------|---------|-----------------|---------------|
| Tuning Parameter Selection | 172 | 11 | 0 = One set only 1 = 2 sets keyboard selected 2 = 2 sets with PV automatic switchover 3 = 2 sets with setpoint (SP) automatic switchover | | | | | | | | | | | | |
| Automatic Switchover Value (used with 172 selection 2 or 3) | 056 | 18 | Within the PV Range in engineering units | | | | | | | | | | | | |
| Local Setpoint Source (Number of LSP's) | 173 | 11 | 0 = One Local Setpoint 1 = Two Local Setpoints (disables RSP) | | | | | | | | | | | | |
| Power Up Mode Recall | 130 | 11 | <table><thead><tr><th>Control Mode</th><th>Setpoint Mode</th></tr></thead><tbody><tr><td>0 = MAN</td><td>LSP1</td></tr><tr><td>1 = AUTO</td><td>LSP1</td></tr><tr><td>2 = AUTO</td><td>Last RSP</td></tr><tr><td>3 = LAST</td><td>Last SP</td></tr><tr><td>4 = LAST</td><td>Last local SP</td></tr></tbody></table> | Control Mode | Setpoint Mode | 0 = MAN | LSP1 | 1 = AUTO | LSP1 | 2 = AUTO | Last RSP | 3 = LAST | Last SP | 4 = LAST | Last local SP |
| Control Mode | Setpoint Mode | | | | | | | | | | | | | | |
| 0 = MAN | LSP1 | | | | | | | | | | | | | | |
| 1 = AUTO | LSP1 | | | | | | | | | | | | | | |
| 2 = AUTO | Last RSP | | | | | | | | | | | | | | |
| 3 = LAST | Last SP | | | | | | | | | | | | | | |
| 4 = LAST | Last local SP | | | | | | | | | | | | | | |
| RSP Source | 131 | 11 | 0 = None 1 = Remote Setpoint via Input 2 | | | | | | | | | | | | |
| Setpoint Tracking | 138 | 11 | 0 = None 1 = LSP = PV (when in Manual) 2 = LSP = RSP (when switched) | | | | | | | | | | | | |
| Control Setpoint High Limit | 007 | 18 | 0 to 100% of PV (engineering units) | | | | | | | | | | | | |
| Control Setpoint Low Limit | 008 | 18 | 0 to 100% of PV (engineering units) | | | | | | | | | | | | |

10.10 Configuration Parameters - UDC 2300, Continued

Control, continued

Table 10-21 Setup Group-Control, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--|------------------|-------------|--|
| Control Output Direction/Alarm Outputs | 135 | 11 | 0 = Direct Action Alarm Output energized 1 = Direct Action Alarm Output de-energized 2 = Reverse Action Alarm Output energized 3 = Reverse Action Alarm Output de-energized |
| High Output Limit | 014 | 18 | –5 to 105% of output |
| Low Output Limit | 015 | 18 | –5 to 105% of output |
| Output Deadband | 018 | 18 | –5 to +25.0% Time Duplex 0.5 to 5.0% 3 position step |
| Output Hysteresis | 019 | 18 | 0.0 to 100.0% of PV |
| Failsafe Mode | 213 | 11 | 0 = Latching 1 = Non latching |
| Failsafe Output Level | 040 | 18 | 0 to 100% |
| Proportional Band Units | 148 | 11 | 0 = Gain 1 = Proportional Band |
| Reset Units | 149 | 11 | 0 = Minutes 1 = RPM |

10.10 Configuration Parameters - UDC 2300, Continued

Communications

Table 10-22 lists all the I.D. codes and ranges or selections for the function parameters in setup group “COM.”

Table 10-22 Setup Group-Communications

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|------------------------------|------------------|-------------|---|
| Shed Time | 154 | 11 | 0 = No Shed 1 = 255 sample periods |
| Shed Mode and Output | 162 | 11 | 0 = Last Mode and Last Output 1 = Manual Mode, Last Output 2 = Manual Mode, Failsafe Output 3 = Automatic Mode |
| Shed Setpoint Recall | 163 | 11 | 0 = To Last Local Setpoint used 1 = Last Setpoint prior to Shed |
| Communication Override Units | 161 | 11 | 0 = Percent 1 = Engineering Units |
| Computer Setpoint Ratio | 021 | 18 | –20.00 to 20.00 |
| Computer Setpoint Bias | 022 | 18 | –999 to 9999. |

10.10 Configuration Parameters - UDC 2300, Continued

Alarms

Tables 10-23 lists all the I.D. codes and ranges or selections for the function parameters in setup group “ALARMS.”

Table 10-23 Setup Group-Alarms

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|--------------------------|------------------|-------------|--|
| Alarm 1 Setpoint 1 Value | 009 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 1 Setpoint 2 Value | 010 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 2 Setpoint 1 Value | 011 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 2 Setpoint 2 Value | 012 | 18 | Within the range of selected parameter or PV span for deviation alarm |
| Alarm 1 Setpoint 1 Type | 140 | 11 | 0 = None 1 = Input 1 2 = Input 2 3 = PV 4 = Deviation 5 = Output 6 = Alarm on Shed 7 = SP Event On 8 = SP Event Off 9 = Manual 10 = Remote Setpoint 11 = Failsafe 12 = PV Rate of Change 13 = Alarm on Digital Input 14 = Alarm based on SP2 15 = Loop Break Alarm Limit Controller: 0 = None 1 = PV 2 = Deviation 3 = Shed |
| Alarm 1 Setpoint 2 Type | 142 | 11 | Same as 140 |
| Alarm 2 Setpoint 1 Type | 144 | 11 | Same as 140 |

10.10 Configuration Parameters - UDC 2300, Continued

Alarms, continued

Table 10-23 Setup Group-Alarms, Continued

| Parameter Description | Identifying Code | Format Code | Range or Selection |
|-----------------------------|------------------|-------------|---|
| Alarm 2 Setpoint 2 Type | 146 | 11 | Same as 140 |
| Alarm 1 Setpoint 1 Event | 141 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 1 Setpoint 2 Event | 143 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 2 Setpoint 1 Event | 145 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm 2 Setpoint 2 Event | 147 | 11 | 0 = Low Alarm 1 = High Alarm |
| Alarm Hysteresis | 041 | 18 | 0.0 to 100.0% of output or span |
| Alarm Latching for Output 1 | 200 | 11 | 0 = Non Latching 1 = Latching |
| Alarm Blocking | 201 | 11 | 0 = Disabled 1 = Block Alarm 1 2 = Block Alarm 2 3 = Block Both Alarms |

Section 11 – Operating the Controller with Communications Option

11.1 Operation

Introduction During communications the controller can operate in various modes and the operator can assume manual control of the output. There are various indications of these actions.

Monitor mode During “Monitor Mode” the UDC will control normally with operator access allowed at the keyboard. See the individual Product Manual.

Slave mode During “Slave” operation:

- Configuration data may not be changed via the front keyboard.
- MAN annunciator is OFF.
- The controller will use override data provided at the computer.

Emergency manual During “Slave” operation the operator can assume manual control of the output (Emergency Manual). The procedure in Table 11-1 tells you how to start and stop emergency manual.

Table 11-1 Emergency Manual Procedure

| Operation | Action |
|------------------------|--|
| Start Emergency Manual | <ul style="list-style-type: none">• Press [MAN/AUTO].• MAN annunciator comes ON.• Press [▲] or [▼] to position the output manually. |
| End Emergency Manual | <ul style="list-style-type: none">• Press [MAN/AUTO] key - this second press ends the Emergency Manual operation. The controller reverts to “Slave” mode, Manual output.• MAN annunciator goes OFF. |

Overriding setpoint or PV indication When setpoint or PV are overridden, a blinking “CSP” appears in the upper display.

Section 12 – ASCII Conversion Table

12.1 Overview

Overview

Table 12-1 lists all the Hex and Decimal designations for all the ASCII Character Codes.

Table 12-2 is a Hex, Decimal, and Binary conversion table.

Table 12-1 ASCII Character Codes

| Control | | | | Figures | | | Uppercase | | | Lowercase | | |
|-------------|--|-----|-----|---------|-----|-----|-----------|-----|-----|-----------|-----|-----|
| ASCII | | HEX | DEC | ASCII | HEX | DEC | ASCII | HEX | DEC | ASCII | HEX | DEC |
| NUL (CTL @) | | 00 | 0 | space | 20 | 32 | @ | 40 | 64 | \ | 60 | 96 |
| | | 01 | 1 | ! | 21 | 33 | A | 41 | 65 | a | 61 | 97 |
| SOH (CTL A) | | 02 | 2 | " | 22 | 34 | B | 42 | 66 | b | 62 | 98 |
| STX (CTL B) | | 03 | 3 | # | 23 | 35 | C | 43 | 67 | c | 63 | 99 |
| ETX (CTL C) | | | | | | | | | | | | |
| EOT (CTL D) | | 04 | 4 | \$ | 24 | 36 | D | 44 | 68 | d | 64 | 100 |
| ENQ (CTL E) | | 05 | 5 | % | 25 | 37 | E | 45 | 69 | e | 65 | 101 |
| ACK (CTL F) | | 06 | 6 | & | 26 | 38 | F | 46 | 70 | f | 66 | 102 |
| BEL (CTL G) | | 07 | 7 | ' | 27 | 39 | G | 47 | 71 | g | 67 | 103 |
| BS (CTL H) | | 08 | 8 | (| 28 | 40 | H | 48 | 72 | h | 68 | 104 |
| HT (CTL I) | | 09 | 9 |) | 29 | 41 | I | 49 | 73 | i | 69 | 105 |
| LF (CTL J) | | 0A | 10 | * | 2A | 42 | J | 4A | 74 | j | 6A | 106 |
| VT (CTL K) | | 0B | 11 | + | 2B | 43 | K | 4B | 75 | k | 6B | 107 |
| FF (CTL L) | | 0C | 12 | , | 2C | 44 | L | 4C | 76 | l | 6C | 108 |
| CR (CTL M) | | 0D | 13 | – | 2D | 45 | M | 4D | 77 | m | 6D | 109 |
| SO (CTL N) | | 0E | 14 | . | 2E | 46 | N | 4E | 78 | n | 6E | 110 |
| SI (CTL O) | | 0F | 15 | / | 2F | 47 | O | 4F | 79 | o | 6F | 111 |
| DLE (CTL P) | | 10 | 16 | 0 | 30 | 48 | P | 50 | 80 | p | 70 | 112 |
| DC1 (CTL Q) | | 11 | 17 | 1 | 31 | 49 | Q | 51 | 81 | q | 71 | 113 |
| DC2 (CTL R) | | 12 | 18 | 2 | 32 | 50 | R | 52 | 82 | r | 72 | 114 |
| DC3 (CTL S) | | 13 | 19 | 3 | 33 | 51 | S | 53 | 83 | s | 73 | 115 |
| DC4 (CTL T) | | 14 | 20 | 4 | 34 | 52 | T | 54 | 84 | t | 74 | 116 |
| NAK (CTL U) | | 15 | 21 | 5 | 35 | 53 | U | 55 | 85 | u | 75 | 117 |
| SYN (CTL V) | | 16 | 22 | 6 | 36 | 54 | V | 56 | 86 | v | 76 | 118 |
| ETB (CTL W) | | 17 | 23 | 7 | 37 | 55 | W | 57 | 87 | w | 77 | 119 |
| CAN (CTL X) | | 18 | 24 | 8 | 38 | 56 | X | 58 | 88 | x | 78 | 120 |
| EM (CTL Y) | | 19 | 25 | 9 | 39 | 57 | Y | 59 | 89 | y | 79 | 121 |
| SUB (CTL Z) | | 1A | 26 | : | 3A | 58 | Z | 5A | 90 | z | 7A | 122 |
| ESC (CTL [) | | 1B | 27 | ; | 3B | 59 | [| 5B | 91 | { | 7B | 123 |
| FS (CTL \) | | 1C | 28 | < | 3C | 60 | \ | 5C | 92 | | 7C | 124 |
| GS (CTL]) | | 1D | 29 | = | 3D | 61 |] | 5D | 93 | } | 7D | 125 |
| RS (CTL ^) | | 1E | 30 | > | 3E | 62 | ^ | 5E | 94 | ~ | 7E | 126 |
| US (CTL _) | | 1F | 31 | ? | 3F | 63 | _ | 5F | 95 | DEL | 7F | 127 |

12.1 Overview, Continued

Overview, continued

Table 12-2 Hexadecimal to Binary

| HEX | DEC | BINAR Y | HEX | DEC | BINAR Y | HEX | DEC | BINAR Y | HEX | DEC | BINAR Y |
|-----|-----|------------|-----|-----|------------|-----|-----|------------|-----|-----|------------|
| 0 | 0 | 0000 | 4 | 4 | 0100 | 8 | 8 | 1000 | C | 12 | 1100 |
| 1 | 1 | 0001 | 5 | 5 | 0101 | 9 | 9 | 1001 | D | 13 | 1101 |
| 2 | 2 | 0010 | 6 | 6 | 0110 | A | 10 | 1010 | E | 14 | 1110 |
| 3 | 3 | 0011 | 7 | 7 | 0111 | B | 11 | 1011 | F | 15 | 1111 |

Section 13 – Cable Specifications

13.1 Introduction

Introduction

Table 13-1 lists the cable specifications for 2000 feet or 5000 feet cabled used for wiring the communications link.

Table 13-1 Cable Specifications

| | 2000 Foot Cable | 5000 Foot Cable |
|--|--|--|
| Cable Type | Two-conductor stranded (twin axial), 100% shield, 120 ohms, #25 AWG, polyethylene insulated, with aluminum-mylar shield, drain wire, and vinyl jacket. | Two-conductor stranded (twin axial), 100% shield, 150 ohms, #25 AWG, datalene insulated, with aluminum-mylar shield, drain wire, and vinyl or teflon jacket. |
| Commercial Equivalent | Belden Corporation type 9271 Twinax | Belden Corporation type 9182 Twinax OR Belden Corporation type 89128 Twinax |
| Electrical Characteristics | | |
| Characteristic Impedance | 124 ohms | 150 ohms |
| Resistance: Center Conductors Shield | 104.3 ohms per kilometer 39.4 ohms per kilometer | 49.2 ohms per kilometer 15 ohms per kilometer |
| Capacitance | 40 picofarads per meter | 28.9 picofarads per meter |
| Attenuation | at 1 MHz – 2 db per 100 meters at 10 MHz – 5.6 db per 100 meters | at 1 MHz – .98 db per 100 meters at 10 MHz – 4.3 db per 100 meters |
| Mechanical Characteristics | | |
| Center Conductor Insulation | Polyethylene | Datalene® |
| Jack Composition | Vinyl (PVC) | Vinyl (PVC) (Belden 9182) or Teflon (Belden 89182) |
| Jacket Outer Diameter | 6.1 millimeters | 8.9 millimeters |
| Environmental Limits | | |
| Temperature | –20 to 80°C (–4 to 176°F) | –20 to 80°C (–4 to 176°F) |
| Relative Humidity | 5 to 95% | 5 to 95% |
| Distance Limits | 625 meters (2000 feet) Cable must be terminated at each end with a 124 ohm $\pm 10\%$ 1/4 watt resistor. | 1524 meters (5000 feet) Cable must be terminated at each end with a 150 ohm $\pm 10\%$ 1/4 watt resistor. |
| Maximum Number of Devices | 15 | 15 |
| Baud Rate | 19.2K | 19.2K |

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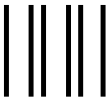
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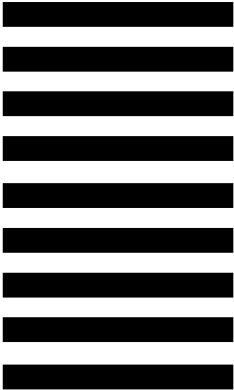
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